THE MEDICAL JOURNAL OF AUSTRALIA

VOL. II.—47TH YEAR SYDNEY, SATURDAY, SEPTEMBER 10, 1960 No. 11

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THE BRAIN-INJURED CHILD.[1]

By S. P. BELLMAINE, D.C.H., F.R.A.C.P.,

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THERE prevails in this community, as in other centres of Western civilization, a certain belief. In the highest academic circles, it reads like this, and I quote from Kanner (1957):

> It is quite conceivable that future textbooks of Child Psychiatry will be organized on the basis of parental attitudes and their effects on children. In fact, one is almost tempted to do so now.

At a somewhat lower level, the level of the practising doctor and of the parents of families in our more privileged areas, the belief is strong, and it tends to be expressed in the words: "There are no problem children, only problem parents!" In a still lower stratum, less articulate in the matter of abstract concepts, the pattern of our society nevertheless remains constant, and leads to such expressions as: "If he were mine, I'd know what to do with him!"

However true this belief may be, that behaviour disorders and personality deviations in children can be linked directly with parental attitudes—however true this belief may be for the attention-demanding devices of many little children, and the delinquencies and sexual promiscuities of many older ones, nevertheless it is a dangerous half-truth, a rotten part-truth, which inflicts much sorrow and guilt upon the parents of certain brain-injured children, and thus is deleterious to the welfare of the children themselves.

I concern myself particularly with this matter, because the brain-injured children, with whom I propose to deal tonight, constitute only a segment of the whole group. I shall not deal with the subject of cerebral palsy. Brain-injured children with obvious motor disturbances may share the intellectual and behaviour difficulties of the whole group; but they are recognized by the medical profession and by the public as distinct, and they and their parents are assured of community sympathy.

Some brain-injured children are so grossly mentally retarded that their commital to an institution is highly desirable. It appears, however, that cerebral birth trauma is not a frequent cause of severe mental defect—in fact, Tredgold (1929) states that not more than 1·5% of all cases of idiocy can be traced to cerebral birth trauma, although other writers give higher figures.

I shall not discuss further the brain-damaged child with severe mental defect. Nor shall I consider the results of

[1] Read by invitation at a meeting of the Section of Neurology, Psychiatry and Neurosurgery of the New South Wales Branch of the British Medical Association on December 12, 1958.

head injuries in older children—a worthy study in these days of swirling motor traffic, but one which I have not made. Henceforth tonight I shall confine my discussion to those brain-injured children who show the following characteristics: they are free of major motor disorder and of convulsions and are without conspicuous mental retardation, but their behaviour is the subject of complaint. The complaint may come from the parents, the siblings, the parents of the child next door, or the nursery-school teacher; usually it comes from all these sources.

In some cases mental retardation may be obvious very early in the baby's life to those who employ the techniques of Gesell, and the parents themselves with sinking hearts will have realized something before the child is a year old; yet whilst the child is still small, up to nursery-school age, the intellectual impairment may not be conspicuous to other members of society who are vocal and condemnatory about his behaviour. As such children grow older, into primary-school age, the disparity between their achievements and those of their age contemporaries becomes more obvious, and the judgements of society now become mollified. However, the special problems presented by the child do not diminish.

In other cases there is no mental retardation, for these are "the brain-injured children with normal I.Q.", who are difficult and different. The child and his parents are misunderstood and misjudged. An affectionate and loving child is, in the eyes of some, just a "little horror"; his parents may come to feel that God has withheld from them some qualities in child-rearing which appear to have been given to even the most ordinary people they know. The neighbours are smug; the siblings are emotionally involved, either fighting with the disturbed child or fighting other children to protect him; the parents are burdened with guilt, and physically and emotionally exhausted.

Brain-injury may not only impair the neuro-psychiatric mechanisms of the child, but it may wreck a whole family. Yet it all commenced by accident.

When I was invited to address you upon this subject, I accepted readily, but with certain feelings of apprehension. I am indeed diffident about speaking of matters psychiatric to an audience containing psychiatrists. I accepted because, although my experience in terms of numbers is small, nevertheless, as a pædiatrician who works amongst neonates, I have had the opportunity to see some of these babies during their initial illnesses, and then to watch them into childhood. In other cases, in which I have not met the child until he was older, a certain familiarity with the events of the neonatal period has allowed me, I hope, to "read between the lines" of the neonatal history as given to me by the mother or as recorded in hospital notes. Since accepting the invitation, I have been gratified to find that at least one eminent psychiatrist, Kanner (1957), appreciates pædiatricians in general, if not in particular. I quote:

> Pediatricians are, as a rule, gentle people. The grouch, the bully, and the iceberg do not usually go into Pediatrics. Contacts with suffering children and worrying parents, the daily little comedies, the occasional tragi-comedies, and the sometimes tragically ending struggles with death, tend to mellow and humanize . . . . Of course, no sensible person expects him to be a Psychiatrist. But the experienced Pediatrician knows how much he can learn in a few minutes about the child, the mother, and the relationship between the two, how quickly he can spot maternal affection, reasonableness, un-reasonableness, anger, nagging, anxiety, over-protection, and infantile composure, compliance, timidity, resistiveness, or stubborn inaccessibility. These observations give him leads for subtle guidance.

Professor Kanner has caused me to hope that the psychiatrists of Sydney have, in general, a similarly benign attitude towards pædiatricians, and my diffidence and apprehension have been somewhat assuaged.

Mr. Chairman, when I collected together the material which I had intended to deliver for this evening, I found that it would have taken nearly two hours of your time. In order to spare you such an ordeal, I have had to modify the paper considerably. I could have presented a synopsis of each part, but I have chosen not to do so; instead, I have eliminated certain sections entirely, and preserved others in all their prolixity. Thus, although I am a physician who uses drugs for these patients, I do not discuss drug therapy; although I am interested in the educational problems of these children, I do not refer to them. There are, in fact, many important aspects which receive no mention. The portions which I have preserved are those which I feel you should hear—those portions, in fact, about which I myself have feelings.

On Ætiology.

The central nervous system of the infant may be damaged by factors acting before, during and after the birth process. These factors are (*a*) anoxia, (*b*) trauma and (*c*) infection.

Anoxia.

Anoxia may act before, during or after labour (perinatal anoxia). Placental insufficiency may cause anoxia before and during labour, and this will be evidenced by fœtal distress. Intense uterine contractions, compression of the cord, maternal hæmorrhage, maternal anæsthesia or birth trauma may produce anoxia during labour. Delay in establishing respiration, due to immaturity of the respiratory mechanisms or to damage of the respiratory centre by preexisting anoxia or birth trauma, may produce anoxia in the early post-natal period. Anoxia will be prolonged and aggravated in the post-natal phase by blocking of air passages with material inhaled in utero, the passage of meconium in utero and the fœtal gasp in utero being themselves due to intrauterine anoxia. Birth trauma may so depress respiration for several days after birth that anoxia is added to the picture.

Trauma.

Intracranial trauma may occur with or without intracranial hæmorrhage, and is usually, but not necessarily, associated with factors such as disproportion, prolonged and difficult labour, precipitate labour and also prematurity.

Infection.

Infection of the meninges and brain may occur in the early post-natal period. In actual fact, the prognosis in neonatal meningitis, which is usually due to *Bacterium coli* and other intestinal organisms, remains poor, and the survivors usually belong to the grossly damaged group.

Intracranial infection as a factor in brain damage is perhaps more important in older infants who have survived, with modern therapy, the meningitides of that age period. In this same hall, a few years ago, Dr. John Beveridge (1954) surveyed the results in the cases of meningitis which had occurred during his period as Chief Resident Medical Officer at the Royal Alexandra Hospital for Children. He spoke of the excellent results obtained, in regard to physical condition and mental alertness, but mentioned the high proportion of behaviour difficulties which these children presented in the ensuing months. No studies had been made to ascertain whether these behaviour disturbances were due to prolonged stay in hospital, or to the effects of residual cerebral damage; it is possible that both these factors were operative.

There are a series of points to which attention is drawn:

1. The factors of anoxia and birth trauma are closely related, and both may operate in the individual case. It is to be noted also that some cases of intracranial hæmorrhage are primarily anoxic in origin, and not traumatic.

2. Normal labour can produce intracranial trauma. It cannot be argued that an infant's symptoms are not due to intracranial trauma "because the labour was normal". All one can say is that normal labour (and Cæsarean section) carry by far the lowest rate of intracranial trauma, as compared with prolonged, difficult and manipu-

lative deliveries. As far back as 1930, Irving of Boston made the following statement:

> Numerous intra-cranial hæmorrhages have occurred when labour has progressed normally and no operative interference has been carried out. Surely there is no bad obstetrics here, and justice and common sense can only lead us to ascribe the results to the unavoidable hazard of birth.

It is also interesting to note how some babies will survive extremely difficult deliveries with never a sign of intracranial trauma.

3. Precipitate labour is no less damaging to infants than is difficult or prolonged labour, and is likely to be confusing to those whose studies are retrospective, for it may be reported (by the mother) as normal labour: "Well, I know that I didn't have any instruments, Doctor."

4. Prematurity is an important predisposing factor in regard to both anoxia and intracranial trauma. The respiratory centre is immature, the pulmonary alveoli may be imperfectly developed, and the respiratory muscles are feeble. Moreover, the intracranial blood vessels are notably fragile. Of all cases of intracranial hæmorrhage of the newborn, 80% occur in premature infants. In a recent paper (1956) Knobloch *et alii*, a Johns Hopkins group, reported, from an anterospective study, that 49% of all premature infants with birth weight of 1500 grammes or less showed neurological abnormalities. Of nearly 500 unselected children making their first attendances at the Spastic Centre in Mosman, including many unquestionably brain-damaged children, I found in a personal survey of their records (1951) that 22% were premature infants. A history of prematurity is of considerable importance when it comes to deciding whether or not a given child's symptoms are due to brain damage; the smaller the birth weight, the greater the significance.

5. Pathological processes producing brain damage in newborn infants, whether anoxia, birth trauma, or infection, do not necessarily, or even as a rule, produce neonatal clinical pictures with striking neurological features. (This remark even applies to some cases of brain damage due to hyperbilirubinæmia.) An infant severely ill under these conditions may present with lethargy, cyanosis, rapid shallow respirations, no bulging of the fontanelle and no recognizable neurological signs or symptoms. If such an infant recovers, he is often reported as having suffered from "pneumonia", and indeed at the Spastic Centre at Mosman, in unquestionably brain-damaged children, a history of "pneumonia" in the first few days after birth was frequently obtained. Very often all that a mother knows is that her baby was blue and given oxygen, and was not brought to her for a few days after birth, or that he was "too tired" to suck at the breast for the first few days.

6. It follows that if rigid criteria are adopted before a neonatal history is regarded as evidence of trauma, many children will be excluded from that category who rightly belong to it; it follows also that many parents frankly do not know that their child has been the victim of brain damage.

7. The art of prognosis is difficult; many children survive definite intracranial trauma and grow up unscathed by it; many children whose neonatal symptoms have been less severe grow up with evidence of severe neurological damage. One is reminded of the Hippocratic statement that "no head injury is so severe as to be despaired of, nor so trivial that it may be neglected".

8. In the last decade there has been a considerable reduction in the number of newborn infants suffering from the effects of anoxia and birth trauma. Cæsarean section, once justifiable only in the maternal interests, is now increasingly practised in the interests of the fœtus, so that fœtal distress and the avoidance of difficult manipulations have become legitimate indications. The benefit to the mother is thus indirect. Moreover, in certain circumstances, obstetricians can now avoid the earlier termination of pregnancy, so that the prematurity problem may be mitigated. It is to be recognized, however, that there are at present certain irreducible minimums; it is probable, also, that because of the skill of modern obstetricians some babies survive, to show evidence of brain damage, who would previously have died.

9. In the management of newborn infants suffering from intracranial trauma, there are varying schools of thought, ranging from the adventurous on the one hand to the ultra-conservative on the other. My own attitude tends towards the conservative, particularly (unless certain definite indications are present) in regard to the use of active measures in diagnosis and treatment. I do regard the efficient use of oxygen as a most important measure, though certain precautions must be carefully observed in the use of oxygen in premature infants.

"The 'Other' Child."

Lewis, Strauss and Lehtinen, in a book written for parents (1951), thus describe the non-conformity of these children:

> Brain injury is an accident which can be neither foreseen nor prepared for. It comes as a fundamental d'sruption into the life of the child and his family. It reduces the original potential of the brain. It results in an anomalous individual who is so different from those who are not brain-injured that we can describe him only as "other". He is in the full sense the "other child". . . . If he is not crippled, and in many cases he is not, the brain injury cannot be detected by a medical examination, and an electro- or pneumo-encephalogram may not show it. Rather it becomes manifest in the general behaviour and intellectual peculiarities of the child which become increasingly conspicuous as he grows older. This child resides in a world whose dimensions are not quite the same as those of the normal world. Perceptual disturbances in the "Other Child" may alter his ideas of length, breadth and width. They alter his conception of time. He is, therefore, a person who tends to become displaced very easily in space and time It is the parents who must find him as he wanders in his own world without sense of direction. . . . The "Other Child" is a natural non-conformist as a result of his inability to perceive and understand the manner in which he is expected to behave. The persistent failure of the brain-injured child to conform to his social milieu is one of the symptoms of his condition. His behaviour is otherwise than that of normal children and the first thing the "Other Child" tends to become in his social relationships is a behaviour problem. It is the experience of many that brain-injured children are not *necessarily* retarded intellectually, and that many occupy the same range of intelligence quotients as normal children.

Elsewhere, Strauss and Lehtinen (1947) write as follows:

> The brain-injured group tend to be erratic, uncoordinated, uncontrolled, uninhibited, and socially unaccepted . . . another behaviour manifestation characteristic should be mentioned. This is the "catastrophic reaction". Because of his hyper-activity and disinhibition, the brain-injured child appears to be elated; it is astonishing, as sometimes happens, to see him burst into explosive crying when confronted with a difficulty. This reaction then is a state of helplessness and complete despair upon being confronted with a situation which seems insoluble to him. In children it usually appears in the form of crying which may be so intense that comforting or appeasement by verbal efforts is unavailing. While the "insoluble situation provoking this reaction may be a difficult task, it need not always be a task which is beyond the child's level of knowledge or established ability. The symptom "perseveration" which appears in the perceptual field is prominent also in behaviour . . . . Stereotyped questions may be repeated innumerable times during a day, . . . even although the answer has been carefully explained. These observations cause the observer to wonder, for such behaviour, . . . is in striking contrast to the child's verbal behaviour and to the intellectual ability which may be indicated by standardized intelligence tests.

My own experience leads me to agree with these views of Strauss and Lehtinen and with the similar views of other writers, and to disagree with those of Ford (1952), who described brain-injured children as "generally placid—normal children labouring under a handicap".

On Diagnosis.

Although it is said that the Wechsler Intelligence Scale for Children has its own pattern for the organic syndromes, and that the "scatter" in the Stamford-Binet test is well known, Strauss and Lehtinen (1947) state that "with few exceptions there does not exist at this moment a pattern or type of response characteristic and specific for the brain-injured defective child on standardized tests of intelligence, academic achievement, and visuo-motor performance", and their 1955 publication does not indicate significant advance beyond that point. Diagnosis thus rests primarily on qualitative estimations of behaviour, together with a history suggestive or consistent with brain injury.

The presence of some minor neurological signs, such as, for example, hypotonicity, absence of abdominal reflexes on one side, or nystagmus or a Babinski sign, would add support to the diagnosis; but their absence would not negate it.

An abnormal electroencephalogram is an aid in diagnosis when the symptoms make the picture; but it does not assist if other indications are missing, and a normal electroencephalogram does not, of itself, exclude the diagnosis.

When the psychological disturbance is of such severity that a measurable retardation of intellectual growth can be observed, if the immediate family history indicates that the child comes from a normal family stock and that he is the only one of the sibship so afflicted, then there is support for the diagnosis of brain injury rather than the endogenous factor.

The Minimal Cerebral Lesion.

Gesell (1947) has made the following statement:

> . . . an entirely negative birth history and an uneventful neonatal period may nevertheless demand a diagnosis of minimal injury because of persisting or gradually diminishing behaviour signs. In obscure or doubtful cases the following is a safe rule: do not assume that there has certainly been a cerebral injury, but assume that every child who is born alive has run the universal risk of such injury.

I, myself, do not know whether or not it is a valid concept that a child may be indeed brain-injured when his behaviour conforms to that of the brain-injured pattern, when his family history is a good one, but when there is no history, even to the discerning, suggestive of cerebral injury. I do know that the early history warrants very careful reconsideration—it may reveal events which caused only brief anxiety, and from which it was assumed that recovery had been complete. In the light of subsequent behaviour and performance, the almost forgotten events may now have significance.

Differential Diagnosis.

With regard to the diagnosis between brain injury and childhood schizophrenia, and between brain injury and psychopathic personality, these problems of differential diagnosis extend into areas where this gentle pædiatrician will not, at present, venture alone.

Behaviour Disorders of Children.

The purposeful negativism of the normal child subjected to coercion, and the purposeful use of attention-demanding devices, including trantrums, do not resemble the erratice impulsive behaviour and catastrophic reactions of the brain-injured child. The tantrums of the normal child should be ignored, or if heeded, heeded with a slap on the bottom; the catastrophic reaction of the brain-injured child should be treated by a warm physical embrace and by removing him from the scene.

The well-known body signs of neurosis, such as tics, nail-biting, thumb-sucking and disturbances of sleep, are not the results of brain injury.

We must, of course, recognize that the brain-injured child is not immune to the effects of environment, inadequate or good. I have seen brain-injured children develop typical anorexia and negativism to coercive toilet training; well handled, they can be very good in such matters. I have seen the brain-injured child on the verge of stuttering, and then, handled properly, develop excellent speech. The brain-injured child reacts to rejection and unkindness outside the home by similar unkindness, to a smaller weaker sibling, as many a normal child would do. Though I readily accept that environmental factors do influence brain-injured children, yet I cannot accept the concept of Ford (1952) who described brain-injured children as "generally placid and good natured—normal children labouring under a handicap rather than unreasonable creatures unless they are mismanaged by their parents or affected by frequent convulsions".

It is important that all doctors who deal with children should be able to distinguish the behaviour pattern of the brain-injured child from the behaviour disturbances due solely to parental mismanagement and to "naughtiness". Such a distinction is, however, beyond some practising doctors; they appear not even to be aware that there is such a distinction to be made. Their attitude is a reflection of that of society in general, or perhaps society's attitude is a reflection of theirs. This is indeed curious, when mere children can, intuitively, recognize the difference in a flash.

On the Ultimate Fate of the Brain-injured Child.

What is the ultimate fate of the brain-injured child of the type I have chosen to discuss? Does he just vanish into the population as another "odd body" whom no one really understands? Or come into conflict with authority, or loll about as an invalid pensioner, or end up in a mental institution? I have no exact answer in this matter, and have not yet been able to follow up any of my own cases from birth to adulthood.

In a personal communication, the Superintendent of the Special School, Glenfield Park School, has given me some information of value; but it is to be noted that it is not based upon an organized follow-up of all ex-pupils, for which as yet there is no provision. However, when any information concerning an ex-pupil reaches the Superintendent, he records it, and he has some such records for seven out of every eight. These data have recently been added to by a survey completed by a research student from the Social Studies Department of the University of Sydney, who inquired into the after-school achievements of 95 persons who had spent three years or more at the school, and who had in 1955 reached the age of 30 years in the case of men, and 25 years in the case of women.

The Special School at Glenfield Park caters for children with an intelligence quotient of 55 to 75 (approximately), and it is the Superintendent's belief that over 85% of them belong to the brain-injured group, and that less than 15% are "other than brain-injured". It is probable, therefore, that information concerning ex-pupils as a whole throws some light on the lives of the brain-injured group. From these data, covering 138 persons who have left the school within the past ten years, together with the above-mentioned data concerning 95 older persons, the following points appear to emerge.

1. Within ten years of leaving the school, about 4% were deceased, about 4% were in mental hospitals, about 4% were invalid pensioners, and about 8% were in irregular or part-time employment, including girls acting as home-helps.

2. Some 80% of ex-pupils were in full-time employment. In the case of the males, these jobs were unskilled and semi-skilled occupations, such as repetitive factory work and labouring work including rural work; but nine out of the 53 men aged over 30 years in the research student's survey, "had achieved jobs which may fairly be described as skilled". In the case of the females, the work pattern was of a similar standard; a number of those regarded as being in full-time employment were married women doing domestic duties in their own homes.

3. About 40% of each sex married. "The housing situation of the married group was generally satisfactory—only a small proportion lived in defective or slum areas."

4. "Single women leading sheltered lives in their parents' homes were in many respects the least independent and most deteriorated group in the whole sample."

5. Conflict with authority seems to have been minimal.

It is to be recalled that the light shed from Glenfield falls upon the brain-injured children who are mentally retarded. On the whole, they appear to be doing surprisingly well; but this success has been achieved during the post-war phase of full employment.

I have no data to offer upon the fate of the brain-injured children whose formal I.Q. tests fall within the higher brackets. It would be expected that their achievements would be greater. I wonder if, with their greater abilities, they clash with society and the law more often than the intellectually retarded appear to have done. I should be grateful for information upon this point.

The Parents.

Bewilderment, turmoil, censure and a sense of failure—these may be the common lot of the brain-injured child, and of his parents. The parents are likely to be more sensitive than the child, and they suffer from more than disappointment.

First and foremost, these parents need our sympathy and understanding. They are coping with a tireless, exhausting problem-child. From daylight to dark he is one person's full-time job. They are thankful for the blessed hours of childhood sleep, when he is at last quiet and restful. Whilst they are looking at their sleeping child, he may stir and half awaken. In this stage between wakefulness and slumber, there is no hyperkinesis, no distractability, no perversity. He responds affectionately, and they feel full of love for him. As he falls asleep once more, he looks like an angel. Come the morning, and it all begins again.

Perhaps these people are receiving some degree of sympathy from their relatives and friends; but understanding is likely to be conspicuously absent. Local opinion is verbalized. "Don't let us go down that end of the beach, where that horrid little boy pushes the kiddies and knocks over their sand castles." "I feel sorry for her, but wouldn't you think she could manage her children better!" "Fancy being away in a caravan shut up with those terrible children." (The siblings are thus involved in the judgements.) The parents work with motivated industry for the local primary school and its parents' and citizens' committees but, associating with the other parents, feel different.

If we as doctors are able to help these people, we have taken a first important step towards helping the affected child himself. If we are to help, we must be able to give sympathy before we give science. These parents need the opportunity to talk with someone who appears to be interested and to understand their problem. They must be made to feel they are not alone. These requiremnts of sympathy, time and talk, can be met by humble doctors; no amount of learning is a substitute for them.

But scientific knowledge and experience do have their place; the physician, confident of the accuracy of his diagnosis, explains in suitable language the ætiology, and his words then carry conviction. He explains the accidental nature of the original cause, which is often tragically obscure to those most involved. This is not a matter of heredity, they are not inferior parents, inferior beings, because they face this special task. Their feelings of guilt and inadequacy must be removed. Only then can they face the realities of the situation, and this facing brings its own relief.

We must encourage them in their dilemma between duty and rejection. We explain that rejection of a child in its various clinical forms is a common human phenomenon. These parents must know that they are not monsters if and when they react to their exceedingly difficult child in an exceedingly human way. Even a well-balanced mother will say: "I love him, Doctor, but sometimes I feel I hate him too, for the way he disturbs the whole family." Any mother placed in the same position would at times feel the same.

Sometimes I have encountered a guilt complex with a theological component. The parent accepts that the whole problem arose from accident, that even a saint would feel rejecting at times, and that the behaviour of the child is not basically the result of mismanagement; nevertheless, the accident is a punishment from God (or fate) for some previous unworthy conduct. This practising pædiatrician, whom no one expects to be a psychiatrist, and who avoids discussions on the theological level, in these circumstances seeks outside help. He can only point to the undamaged nervous systems possessed by the sons of other sinners, and say that sooner or later everybody encounters sorrows, and that sorrows help to shape people for better or for worse.

In discussing with the parents the problems of rejection, I do not think it wise to dwell on the subject of "compensatory overprotection". I believe with Lauretta Bender (1956) that these children have

> an actual need . . . for prolonged "babying" and support. They [the parents] are frequently subjected to outside criticism of "babying" and "over-protecting" the child. Yet they cannot emancipate the clinging child, and they become guilt-ridden. . . . Temper tantrums can often be controlled by close embrace and physical contact. . . . The mothers of organic-driven hyperkinetic, distractable children, often need to understand in great detail the disorganizing effect on the child that stems from a marked impulse disorder. Only then can they begin to cope with this extremely difficult behaviour. The child's organic need for close, prolonged mothering, for a warm physical contact, and for external support is seen clinically in his reaction to being picked up and held closely but firmly when he is having a temper-tantrum, a destructive outburst, or other acute anxiety equivalent. Parents are always asking how to punish, how to teach right and wrong to children. We must explain to the parents that . . . the child is reacting to anxiety with his own hyperkinesis and drive rather than exclusively to rejection and hostility. Thus physical embrace and human warmth can control certain forms of behaviour without leading to subsequent guilt on the part of the parent, and at the same time reducing the child's anxiety by integrating it and patterning disorganized impulses.

If we advise firmly against over-protection, we may be depriving the child of his actual physical needs, and intensifying the parental feelings of guilt. Let us, therefore, more simply, counsel against over-indulgence of the child; he should not be given everything he asks for because of the parents' sorrow or love for him; his whims and wishes do not take precedence over the whole family; the domination should not be passed over to the child. This simple counsel is itself a counsel of perfection, and parents, being imperfect, can only try to do their best.

Whilst sympathizing with the parents and showing our understanding, we must be careful not to imply that the brain-injured child is immune to the effects of inadequate environment, or that all abnormal behaviour symptoms are the results of organic lesions. We can offer advice along the following lines.

1. Reduction of stimuli: many toys at once, furniture, noise, cause him confusion.

2. A room of his own and a fenced yard, so that he can get away on his own; too many children stimulate him to antisocial behaviour.

3. A fixed routine—the cornerstone of management.

4. Discipline—discipline him by removing him from the scene and by isolation.

5. Learning to predict the child's reaction in specific situations; this helps to prevent difficulties.

6. The warm physical embrace for the "catastrophic reaction".

7. One person's care—he is one person's full-time job, if possible.

8. Appreciation of the fact that childhood is not merely a preparation for life, but part of life itself.

Yet we cannot give them any simple formula for handling the "other child". Neither kindness nor consideration, rigid discipline nor harshness, can be considered a "method" in itself. In the last analysis, insight, patience and love for the child are the attributes which will bring the best results. We must guide the parents to the social agencies and educational facilities which will help them, and it is of therapeutic value for them to associate with other parents similarly afflicted.

Far too often the parents are dissipating their energies by worrying into the distant future, pondering decisions that will not have to be made for years to come. I advise looking but one or two steps ahead. When he is three years of age, let them concern themselves with arranging, now, a quiet and orderly routine, with a minimum of distraction, and put his name down for a nursery school for normal children. At this stage it is futile to worry about secondary schooling, or whether he will be able to earn his living. Questions very often become easier to answer when we are closer to the event. Osler said (in a different context): "Change that hard phrase 'sufficient for the day is the evil thereof' into 'sufficient for the day is the goodness thereof'." I find this to be most helpful advice for the parents of brain-injured children.

Figure I.
The Other Child.

When we speak, we are likely to reveal a little bit of the chosen subject, and a good deal about ourselves. You will have guessed my story. It is well known to your President and another member of the committee which invited me to address you tonight. I am the father of a brain-injured child. The little boy in the photograph, the little boy in the group, but not of it, is my son. A fine eight-and-a-half-pound baby, borne of a precipitate labour, he spent his first six post-natal days hovering between life and death. Now he is an affectionate lad, who is finding calmness and self-assurance, and making progress, too, at the Special School, Glenfield Park School. Perhaps he is a little over-indulged; but I think that he has great confidence in his parents. Short on the side of performance, he nevertheless has a wonderful vocabulary and is a great talker. I leave it to others to determine how far this disparity is typical of the brain-injured child, and how far, in this particular case, it is a matter of the genes. What will become of him? We do not know; he is only eleven years of age, and I practise what I preach, "sufficient for the day is the goodness thereof".

I make no apology for a personal and probably emotional approach to this problem. I leave it to my colleagues to redress the balance with objective and factual statements.

Conclusion.

In conclusion, let me quote from a modern Australian novel.

> There was a man who had a cross and his name was Macauley. . . . He had two swags, one of them with legs and a cabbage-tree hat, and that was the main difference between him and others who take to the road . . . Wherever Macauley went the child went with him. It was his real swag. The one he carried on his back was a mere nothing. That swag when he hoisted it and strapped it about his thick shoulders stayed put and gave him no trouble. If he put it on the ground it didn't walk away. He didn't have to wash it and comb its hair. It never had to have its buttons done up. It was never the burden to slow him down.

Regarding his own story, D'Arcy Niland (1955) says:

> It is a Biblical truth that all men have burdens. This is the simple story of a man with a burden, a swagman with his swag or "Shiralee", which in this case happens to be a child. I have often thought that if all burdens were examined, they would be found to be like the swagman's Shiralee . . . not only a responsibility and a heavy load, but a shelter, a castle, and sometimes a necessity.

Summary.

1. The attitude of the community towards the behaviour disorders of brain-injured children is examined.

2. Ætiological factors are discussed.

3. The concept of the "other child" is repeated.

4. The ultimate fate of brain-injured children is discussed. Some of them appear to be doing surprisingly well; but this success has been achieved during the post-war phase of full employment.

5. The situation of the parents is considered. It is necessary that they feel that their special problems are understood. They must be advised to live in the present, and not to shoulder in advance the burdens of the future.

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THE USE OF INTRAVENOUS DRIP INFUSION OF OXYTOCIN IN THE MANAGEMENT OF FŒTAL DEATH IN UTERO IN PRIVATE PRACTICE.

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IN 1943 Page reported the use of "Pitocin" by means of an intravenous infusion in cases of uterine inertia; and in 1948 Theobald, Graham, Campbell, Gange and Driscoll published the results of a large series of cases in which pituitrin given by the intravenous drip method was used in the induction of labour and in the treatment of uterine inertia. Since then there has been a large number of papers describing the use of the intravenous drip administration of oxytocin in these circumstances; but until

recently little mention has been made of the technique in the treatment of missed abortion or fœtal death in utero. Loudon (1959) has reported a series of 18 cases from the Royal Infirmary, Edinburgh, and claims that the technique, with "Pitocin" as the oxytocic substance, offers a reliable, rapid and safe method of managing missed abortion.

This impression is confirmed by a small series of six cases of fœtal death in utero managed in this way during the past two years at the Mercy Maternity Hospital, East Melbourne. As with Loudon's cases a high concentration of oxytocin was used, and the deliveries were all uneventful, with no indication that there had been an introduction of toxic substances of an anticoagulant nature from the placenta into the maternal circulation. Reports have been appearing in the literature showing that some cases of fœtal death in utero are associated with severe hæmorrhage and afibrinogenæmia, and that it is desirable to effect delivery as soon as possible after the diagnosis has been confirmed. In addition, early delivery alleviates the mental distress associated with the patient's knowledge that her baby is dead. Beischer (1959) states:

> The management of fœtal death in utero, because of the risk of hypofibrinogenæmia developing, poses the problem of whether or not labour should be induced .... It is now considered hazardous to use oxytocics in such cases unless the clotting mechanism is previously restored by fibrinogen given intravenously.

This opinion has not been confirmed by Loudon's recent work, nor do I share it.

The six cases in this series were all conducted in a private maternity hospital, and their management is reported for the following three reasons: first, it is believed that the technique mentioned is the correct one for the management of fœtal death in utero, particularly when this occurs in the middle trimester; secondly, the oxytocic substance used was "Syntocinon" (Sandos), a synthetic drug with similar effects on the uterine muscle to "Pitocin"; and thirdly, there is no published report of this technique being used on private patients in this country. There were no failures, and, together with six other cases involving the intravenous drip administration of "Syntocinon" with live-born infants after surgical induction of labour, they form a series large enough to convince me that it is now not necessary to send "problem cases", which obviously should be managed with an intravenous drip infusion, to the safety of a public hospital unit, where the drip can be constantly observed by the house officers. The deliveries in every case were a satisfactory reward for a quiet Saturday spent at the hospital, for in each case the induction of labour was conducted on that day of the week and the drip was observed during daylight hours. Commenced in the morning, four of the drip infusions succeeded in inducing contractions which resulted in deliveries at the end of the day. The other two succeeded when recommenced the next morning, after being discontinued for the night. In each case the death in utero had been caused by isoimmunization with the Rh factor. The membranes were not ruptured until the infusion had caused some dilatation of the cervix, and the concentration of "Syntocinon" used in the infusion was much higher than that considered necessary to effect delivery of a live-born infant after artificial rupture of the membranes.

Method.

Initially 10 units of "Syntocinon" were injected into a "Soluvac" flask containing 5% dextrose solution. The needle was inserted into a forearm vein such a way as to allow the patient maximum freedom of movement. The "Syntocinon" solution was allowed to run in at the rate of approximately 12 drops per minute. This rate was increased in increments of 12 until a maximum rate of 60 drops per minute was reached. This rate was either continued or retracted according to the response of the uterus and the reaction of the patient to the discomfort of the artificially induced contractions. In the case of all the live-born infants the amount of the "Syntocinon" was not altered, but in the "dead" group under discussion, a greater amount was obtained in each case by adding an extra 10 units to the first three-quarters of the flask—approximately 750 ml.—and then 20 units to half the flask (500 ml.). In each of these cases a second flask was required, and this was commenced with 50 units of "Syntocinon" to 1000 ml. of 5% dextrose solution and the amount was not afterwards altered. The rate of flow was frequently adjusted to give a constantly increasing dosage of "Syntocinon". When regular painful contractions were experienced by the patient the rate was no longer increased—in fact, it was often cut back and injections of pethidine were given as required. In all six cases the rate was cut right back almost to nothing just before delivery of the dead fœtus, but the flow was recommenced to stimulate the uterus to contract again and expel the placenta.

TABLE I.

Patient.	Number of Pregnancies.	Time of Fœtal Death in Utero. (Weeks.)	Time of Delivery.	Remarks.
A	5	30	31	Delivered after 8 hours.
B	3	30	33	Delivered after 13 hours.
C	3	29	31	Delivered after 12 hours.
D	4	26	28	Delivered after 13 hours.
E	3	27	31	Delivered after 12 hours on the second day. Infusion discontinued after 6 hours on the first day.
F	8	25	26	Delivered after 6 hours of infusion on the second day. Infusion discontinued after 6 hours on the first day.

Discussion.

I am convinced that many Cæsarean sections in private consulting practice could be avoided by the use of the intravenous drip administration of oxytocin. Surgical induction of labour, particularly several weeks before term, is often correctly indicated nowadays for various reasons, but it is sometimes followed by failure of the patient to come into labour. With intramuscular or subcutaneous injection of oxytocic substances there is no effective control of the amount of extract circulating in the blood-stream and acting on the uterine muscle, and the response is often disappointing. It has been proved in the public hospital units that most of these patients can be delivered normally after the use of oxytocin by means of an intravenous infusion. It can also be done in private practice, thus avoiding the alternative of a Cæsarean section or transfer of an unwilling patient to a public hospital unit. In the case of fœtal death in utero, most obstetricians now believe that in the light of modern knowledge concerning afibrinogenæmia it is desirable to deliver the fœtus within five weeks of the diagnosis of fœtal death. This problem alone has resulted in the admission of many private patients to public hospital units.

The cases mentioned in this series were all observed personally from commencement of the drip infusion to delivery. The infusions were all commenced at 9 a.m., and delivery was conducted before midnight the same day. The senior sisters at Mercy Hospital are now familiar with this procedure and its effects, and I am confident that in the future they will be capable of observing such cases, allowing the obstetrician to leave the hospital for short periods safely.

Contraction of the uterus during labour is inevitably associated with a diminished return of blood from the placenta. For this reason ergometrine, which causes prolonged contraction of the myometrium, must not be used until the fœtus is delivered. Oxytocin is the only substance which can be used to induce labour or to increase uterine activity, and it should always be infused intravenously. Reviewing the important stages in oxytocin

research, we find that the effect of posterior pituitary lobe extract on the uterus was discovered in 1906 by Dale. However, more than twenty years went by before Kamm and his co-workers (1928) succeeded in obtaining a posterior pituitary extract, "Pitocin", which consisted mainly of oxytocin—that is, was largely, but not entirely, free from vasopressin. Another twenty years elapsed before its structural formula was elucidated, and finally it was synthesized and developed for production on an industrial scale. Since 1956 the synthetic hormone has been available to the clinician under the trade name "Syntocinon" (Sandos).

Conclusion.

An obstetrical colleague recently commented to me: "With the great advances in modern obstetrical management, it is a pity that we are unable to practise in private all the things we do in the public clinic." This remark stimulated me to report my series of cases.

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THE TREATMENT OF CARCINOMA-IN-SITU OF THE UTERINE CERVIX.[1]

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THE treatment of carcinoma-in-situ of the cervix must depend on the natural course that this condition may be expected to follow. We in Australia can only rely on work done overseas for this information. Recently many articles have appeared in the international literature with regard to this subject, and of these three will be mentioned.

It is the belief of Anderson (1959) that spontaneous retrogression of carcinoma-in-situ does not occur, as the patients in whom it has been reported had all been subjected to multiple biopsies. He considers that the procedures of biopsy and curettage or even mere cleaning of the cervix may completely remove the area where carcinoma-in-situ exists. Anderson does not expect that this problem of spontaneous regression will ever be solved, because in so many patients the original biopsy will remove the whole area. In other words, diagnosis is often treatment. Anderson discusses the problem of how much material must be examined before the clinician can be sure that no invasive lesion is present, and advocates cone biopsy of the endocervix.

[1] Delivered at a symposium on carcinoma of the cervix, arranged by the Melbourne Medical Post-Graduate Committee and the Victorian Anti-Cancer Council on November 7, 1959.

Carter (1956) kept under observation for varying periods 60 patients with cancer-in-situ. Among them, one year subsequent to diagnosis, only five continued to show positive results of smear examinations, and in none was invasive carcinoma present. In another group of patients who had undergone total hysterectomy as treatment for carcinoma-in-situ, the only ones to show abnormalities in the vaginal smear were two patients who had developed carcinoma in the vagina. Carter advocates conservative treatment when the diagnosis of carcinoma-in-situ is made during pregnancy, although a few of his patients in this category were treated by total hysterectomy. Several patients have had successful pregnancies subsequent to the discovery of the condition during pregnancy.

Petersen (1956) has followed 127 patients in whom the initial diagnosis was carcinoma-in-situ. All 127 have been followed for at least three years, 104 for at least five years, and 38 for 10 or more years. After one year's follow-up 4% had developed manifest invasion. After three years' follow-up, 11% had developed manifest invasion. After nine years' follow-up, 33% had developed manifest invasion, and of the remaining 66%, 10% still showed carcinoma-in-situ and 56% had normal cervices. Peterson also states that in those followed up for 11 years, either the lesion was invasive, or by that stage retrogression had occurred. He concludes that the diagnosis of carcinoma-in-situ does not demand immediate measures, although a thorough investigation of the exocervix and endocervix is essential. If no invasive carcinoma is found, he recommends follow-up with colposcopy, biopsy and cytology.

Experience at the Royal Women's Hospital.

Since 1949 and prior to the introduction of the cytology service at the Royal Women's Hospital in 1958, 49 patients were diagnosed as having carcinoma-in-situ. In this series the average age of patients was 42 to 43 years; in most published series it is 37 to 38 years. The presenting symptoms were vaginal bleeding (27 cases), uterine prolapse (7 cases), vaginal discharge (8 cases) and backache (4 cases). One patient presented with pruritus, one with dysmenorrhœa, and one was asymptomatic.

On visual examination, 40 of the cervices were abnormal and in only nine was the cervix normal. Of those which appeared abnormal, 23 presented the appearance of chronic cervicitis (not suspicious), 10 that of chronic cervicitis (suspicious), four that of clinically invasive carcinoma, and one that of decubitus ulcer. In most published series great emphasis is laid on the fact that, in practically all, the appearance of the cervix is normal and there is no indication for biopsy.

At the Royal Women's Hospital cervical biopsy is a routine investigation in all patients with an abnormal cervix and therefore the diagnosis of carcinoma-in-situ was seldom a chance finding. Ten cases were found incidentally after surgery (in six the cervix was clinically normal), and 39 were found as a result of cervical biopsy (in three of these the cervix was clinically normal). In the nine patients with apparently normal cervices the diagnosis was fortuitous; in six it was made when the cervix was examined after total hysterectomy or amputation of the cervix had been performed for some other gynæcological reason, and in the remaining three a biopsy specimen of the cervix was taken by chance during the procedure of curettage for menorrhagia. There can be no doubt that many cases of carcinoma-in-situ remained undiagnosed during this period, since biopsy specimens were taken as a routine only from patients with disease of the cervix.

Treatment.

During the decade under consideration treatment of carcinoma-in-situ has varied. It has been either definitive or conservative as shown in the following tabulation.

Definitive:

Total Abdominal Hysterectomy	27
Vaginal Hysterectomy	3
Wertheim Hysterectomy	7
Excision of Cervical Stump	2

Conservative:

Cauterziation of Cervix	5
Amputation of Cervix	1
Cervical Biopsies	4

Definitive Treatment.

In 30 patients a hysterectomy was performed, with or without bilateral oophorectomy, and in two a cervical stump was excised; in seven patients Wertheim hysterectomy was carried out and in four of these radon was used prior to the operation.

Conservative Treatment.

The remaining 10 patients received conservative treatment; cauterization of the cervix was practised in five, cervical biopsy in four, and amputation of the cervix in one. Of the 10 initially treated conservatively, seven now have "negative" smears, six having been treated by cauterization or amputation of the cervix or by multiple biopsies; one had a total hysterectomy, for reasons not stated. Of the other three patients, two continued to show carcinoma-in-situ on biopsy, and total hysterectomy was performed on each; the remaining patient developed an invasive carcinoma in the vagina for which a radical operation was performed.

Thus of the 10 initially treated conservatively, seven were cured by the method adopted, as evidenced by "negative" smears and repeated biopsies; in the other three, two continued to show histological evidence of carcinoma-in-situ and one developed invasive carcinoma, not in the cervix but in the vagina.

Of the 49 patients under review, 10 were treated by hysterectomy before the diagnosis was made, so that only 39 required decisions with regard to treatment. Of these 39, 29 were treated surgically, invasive carcinoma of the endocervix being found in the operation specimens of three; five (four who had received pre-operative radon therapy being omitted) had normal cervices, and 17 carcinoma-in-situ. Of the remaining 10 who were not initially treated by total hysterectomy, six remain well and with negative results of examination smear, three have had a total hysterectomy and one has developed an invasive carcinoma of the vagina. This means that in the 39 patients under consideration, either the method used to diagnose the condition, or purely local treatment, removed all evidence of carcinoma-in-situ in 11 patients. However, in three patients who had undergone surgical treatment, an invasive lesion was found in the endocervix. This highlighted the danger of not performing a thorough investigation in all patients with carcinoma-in-situ, before definitive treatment is instituted.

Invasive carcinoma of the vagina occurred in two patients subsequent to total hysterectomy, and to these must be added the third patient who developed carcinoma of the vagina after conservative treatment.

Although efforts are directed to a thorough investigation of the exocervix and endocervix, the vagina should not be forgotten, because there is always the possibility of its involvement. It seems that carcinoma-in-situ of the cervix may represent a widespread change in any part of the Müllerian system, and Schiller's test of the vaginal epithelium is a necessary part of any investigation.

Late Follow-up.

All 49 patients are alive and well.

Discussion.

The fact that the average age of patients with carcinoma-in-situ of the cervix is a decade younger than that of those with the invasive form of carcinoma is a mixed blessing. It allows procrastination by the gynæcologist, for there is obviously a period of grace. As the condition occurs in the child-bearing years treatment is conservative, because the gynæcologist wishes to preserve the uterus of any woman of age less than 40 years for psychological reasons, and to allow her to fulfil any desire she may have for future child-bearing. It is impossible after making a histological diagnosis of carcinoma-in-situ to forecast which patient will continue to have positive results of examination smear, with the lesion eventually becoming invasive, and which will subsequently have a negative result, and consequently be counted as a "cure". According to present knowledge the chances are about even.

For psychological reasons it is hardly a justifiable approach, in women under 40 years, to perform a routine hysterectomy for a condition which in less than half of the cases will become an invasive carcinoma if left untreated. On the other hand, to be able, by a relatively simple procedure, to spare the patients the more formidable treatment of established carcinoma renders the lesser procedure justifiable.

The following course of action is suggested as an acceptable compromise:

1. In women over 40 years in whom the diagnosis of carcinoma-in-situ is made by exfoliative cytology, there should be performed multiple four-quadrant biopsies of the cervix and a Schiller's test of the cervix and vagina. If such biopsy material reveals invasion, the patient must be treated for cancer of the cervix. If the diagnosis of carcinoma-in-situ is confirmed histologically, a cone biopsy of the endocervix should be performed under anæsthesia; if no invasion is found in the specimen, a total hysterectomy should be performed. The extent of the vaginal cuff should be modified generously, according to how much staining of the vagina has been obtained by the Schiller test.

2. In women under 40 years in whom the diagnosis of carcinoma-in-situ is made by exfoliative cytology, treatment will depend on the desire for more children and whether a pregnancy is present at the time of diagnosis.

If the patient is pregnant and the cervix is clinically normal, a biopsy is not necessary until the puerperium. Careful observation of the cervix is maintained during the pregnancy, and if a macroscopic lesion develops a biopsy specimen should be taken. Similarly, if pregnancy and a macroscopic lesion coexist when the patient is first seen, a biopsy specimen must be taken. If the diagnosis of carcinoma-in-situ is confirmed histologically, further smears and biopsy specimens should be taken after the pregnancy and the patient treated as recommended below.

If the patient is not pregnant or if a positive result of a smear examination was found during a preceding pregnancy, multiple four-quadrant biopsies are taken and Schiller's test is applied to the vagina and cervix. It is usual to wait for three months after delivery. If such investigation reveals neither carcinoma-in-situ nor invasive carcinoma, cauterization of the cervix is undertaken if cervicitis is present. If the diagnosis of carcinoma-in-situ is confirmed a cone biopsy of the cervix is performed; if no invasion is found smear examinations should be repeated every three months; if at the end of 12 months the smear findings remain negative, follow-up smears can be examined every six months. If the smear findings remain positive after the cone biopsy, the domestic, social and psychological implications of a hysterectomy must be taken into consideration and a decision reached.

The treatment of carcinoma-in-situ must represent a blending of the patient's wishes, the observations of the cytologist and the pathologist, and the conscience of the clinician. The patient must be cooperative and should realize the importance of follow-up examinations, the cytologist must demand good smears and give concise reports, the pathologist who is the cornerstone of the team must have certain criteria for making a diagnosis and be prepared to examine numerous blocks before reaching his conclusions, the clinician on whom the responsibility for the final decision rests must have confidence in his co-workers and must be able to turn to the microscope and find himself on common ground with the cytologist and pathologist; each individual case must be the subject of discussion between the three experts prior to treatment being determined.

Conclusions.

1. When a diagnosis of carcinoma-in-situ is made it is essential to establish that no invasive carcinoma of the cervix is present. In this series such a complication was present in three out of 39 patients.

2. Diagnostic investigations may completely remove the lesion. This occurred in 11 out of 39 patients in the series presented.

3. Total hysterectomy is not always a cure for carcinoma-in-situ. In two of the 30 patients so treated a carcinoma of the vagina subsequently developed; this also occurred in another patient who had been treated conservatively.

4. Unless invasive carcinoma is present, there is no need for surgical treatment during pregnancy.

5. In patients under 40 years, thorough investigation may be followed by purely local treatment with satisfactory results, as evidenced by the results of regular examination of vaginal and cervical smears.

6. The decision as to the best method of treatment is as difficult to reach as recourse to surgical treatment is easy.

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MURRAY VALLEY ENCEPHALITIS IN PAPUA AND NEW GUINEA: II. SEROLOGICAL SURVEY, 1956–1957.[1]

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THE virus of Murray Valley encephalitis (M.V.E.) was isolated in 1951 from four patients infected in the Murray Valley in south-eastern Australia (French, 1952; Miles and Howes, 1952). Serological studies indicated that subclinical infection of humans had been widespread both in the Murray River basin and on Mornington Island in the Gulf of Carpentaria, and also that many species of birds had been infected with this or a related virus (Anderson *et alii*, 1952). Later studies have confirmed and extended these observations within Australia (Miles and Howes, 1956; Ludford and Cook, 1957; Doherty *et alii*, 1959).

Murray Valley encephalitis virus was isolated from a native in Papua in 1956 (French *et alii*, 1957), and in 1956-1957 sera were obtained from humans and domestic chickens, wild birds and fruit bats in Papua and the Australian Trust Territory of New Guinea. This paper reports the results of an examination of these sera for neutralizing antibody to the viruses of Murray Valley encephalitis and Japanese B encephalitis (J.B.E.).

Materials and Methods.

Humans were bled with a needle from the antecubital vein, and chickens from the wing vein directly into a sterile tube. Fruit bats and wild birds were bled from the heart immediately after death. Sera were separated with a sterile pipette within 24 hours and stored as soon as possible at −20° C. The interval before freezing was unavoidably prolonged up to three weeks in some cases, during which time the serum was at room temperature. This applied particularly during the long patrols in the country behind Port Moresby.

The majority of sera were collected between July 16 and September 2, 1956; but the sera from the Vanapa river valley, the upper Brown river and the Tupuserei coastal region south-east of Port Moresby, and many of the sera from the Sogeri district, were obtained by one of the authors (N-K) during several prolonged patrols on foot in October, November and December, 1956.

Chicken sera were from birds which had lived all their life in the same area, and the great majority of birds were less than three years of age. All the human sera were obtained from natives who had lived all their life in the one district. Their ages were sometimes accurately recorded in village registers; at other times they were assessed by experienced Europeans living in the district. Those aged less than 15 years we have called children.

The viruses used in the laboratory were the tenth mouse passage of a strain of M.V.E. isolated in 1951 (French, 1952) and the Nakayama strain of J.B.E. virus received from the Commonwealth Serum Laboratories, Melbourne, in its 42nd mouse passage, and passaged three times in suckling mice in this laboratory.

Immunization of guinea-pigs was by one intracerebral injection of 10^8 suckling mouse LD_{50} of virus. The guinea pigs were bled four weeks later.

Serum antibody was estimated by intraperitoneal inoculation of suckling mice (Anderson, 1953), virus being suspended in undiluted unheated normal rabbit serum. Before use, all sera were heated at 56° C. for 30 minutes. For spot tests, a dilution of 200 LD_{50} of virus was mixed with an equal volume of undiluted serum, held for 30 minutes at 4° C., and injected into six mice; survival of all mice was taken to indicate that the serum contained neutralizing antibody to M.V.E. virus.

The Collection of Sera.

The survey within the island of New Guinea was confined to the eastern half of the island (Figure I). This section of the island is administered by Australia, and includes Papua in the south and the Australian Trust Territory of New Guinea in the north. A chain of mountains runs as a backbone along the island, with a central valley floor at about 6000 feet above sea level, and peaks rising to 14,000 feet. To the north and south of this range lie wide coastal plains with slow rivers and many areas of swamp, savannah grassland and rain forest.

Central Highlands.

A slowly-flowing river runs through the Highland valley; trees were sparse in the valley floor, and birds were rarely seen. Twenty-nine sera were obtained in Goroka from adult natives who had come in from outlying villages; eight native children were bled in Nondugl, 27 in Minj near Nondugl, and 13 in Kainantu. Twenty domestic chickens were bled at Korn, 10 at Hagen, 19 at Nondugl and 28 near Minj. Seventeen chickens were bled by Mr. P. K. Moloney, the Assistant District Officer at Lake Kutubu. This large lake is on the southern slopes of the Highlands at an elevation of about 3000 feet. It is reported that wild birds are sometimes seen here in large numbers.

Rabaul.

This large town is on the north-eastern tip of the island of New Britain; the nearby country was well wooded, but birds were not numerous. Twenty-five sera were obtained from adults and children, many of these being sent to Melbourne by Dr. W. E. Smythe early in 1957. Twenty-two chickens were bled at Rabaul and in the nearby village of Matapit late in 1956.

[1] This work was supported in part by a grant from the National Health and Medical Research Council, Canberra. The first paper of this series was published in *Amer. J. trop. Med. Hyg.*, 1957, 6: 827.

The Markham Valley.

Lae, at the mouth of the Markham river, enjoys an annual rainfall of about 200 inches. Labu is a native village on the opposite bank of the Markham, situated near a swamp and surrounded by dense rain forest. Seventeen native children and two chickens were bled in Labu, and 37 chickens in Lae and along the adjacent Lae-Bulolo road.

Kaiapit is in more open country about 500 feet above sea level, and near by there are extensive riverside flats which are well wooded. From the air many large white birds were seen, possibly white egrets. Thirty-nine elderly native women, who stated they had never left the district, were bled by Mr. E. Möller in Kaiapit in June, 1957.

The Sepik Area.

Only the lower half of the river was visited, where it flows slowly through flat country which is well covered

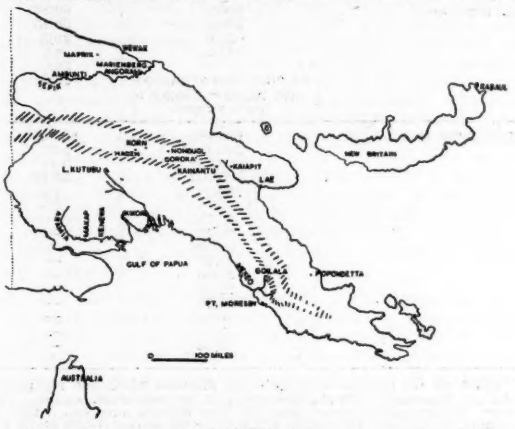

FIGURE I.
Map of the eastern half of the island of New Guinea and nearby islands.

with vegetation. No birds were seen either from the air or on the ground; but local reports stated that water birds of various species were sometimes plentiful. Sera were obtained from Marienberg, Angoram, Ambunti, Maprik and Wewak.

The Western District.

The annual rainfall is more than 200 inches. The country is flat and mostly covered with trees. On the coastal plains sago palms were growing in swamps and along the edges of lagoons and waterways, and from the air many large flocks of birds were seen, probably egrets, herons and Torres Strait pigeons. Two centres were visited in this region—the town of Kikori, and a section of the Aramia river. Kikori is on the banks of the river of the same name, which here consists of a maze of deltas and waterways extending over nearly 400 square miles.

The Aramia river flows into the Gulf of Papua 70 miles south-west of Kikori. Villages were visited along a stretch of 100 miles of river, from Kenewa to Makap. This stretch of river runs through three types of country. At the coastal end, the villages of Kibani and Kenewa are in dense rain forest with many swamps and large areas of sago palm, while further inland the villages of Kotare, Aketa, Kewa, Urado and Balimo are in more open country, where swamps and lagoons are still abundant. Further upstream, Mumuni and Makap villages are on the fringe of lightly-wooded country which extends to the foothills of the southern slopes of the Highlands. Mosquitoes were biting viciously along all of the section of the river visited, both throughout the day and after nightfall.

Port Moresby and Surrounding Districts.

Port Moresby is situated among low hills on the southern coast of the island of New Guinea (Figure II). The local rainfall is about 40 inches a year, and trees and birds are scarce, but this type of country extends for only 10 or 15 miles inland. To the north and north-west of the town, dense rain forest then appears and spreads over a large area of swampy land, including the district between the Brown and Vanapa rivers, and extending as far as Galley Reach; the annual rainfall is 60 inches. Birds were frequently seen between the Brown and Vanapa rivers, and several herons and cormorants were shot. Mosquitoes were biting viciously, particularly at nightfall. Further to

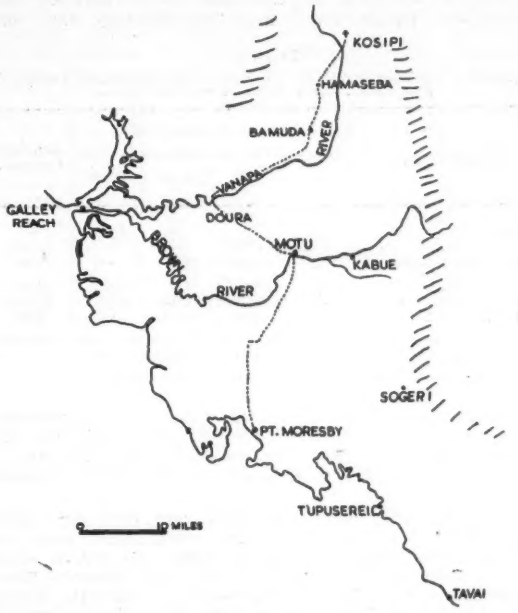

FIGURE II.
Map of the environs of Port Moresby.

the north and east are the foothills of the Highlands, and the sources of the Brown and Vanapa rivers. These foothills rise to 6000 feet in places, and to the east of the town, at Sogeri, come within 20 miles of Port Moresby.

Results.

Spot Tests Against M.V.E. Virus.

All sera were first examined by a spot test, using undiluted serum and about 100 LD_{50} of M.V.E. virus.

No antibody was found in the Highlands (48 children, 29 adults and 94 chickens), Rabaul (25 children and adults and 22 chickens), the Lae-Bulolo district (17 children, 39 chickens), near Kikori (19 children, 34 chickens), at Hanuabada in the Port Moresby township (64 adults), at Sogeri (27 children) or at Popondetta (29 adults).

Sera containing antibodies were found in the valleys of the Markham, Sepik and Aramia rivers, and in the plains and swamps behind Port Moresby (Table I).

In addition to the foregoing figures, the following findings are presented as being relevant to the only known fatal infection with M.V.E. in New Guinea. The patient was a native, who had walked from the Goilala subdistrict, down the Vanapa Valley, through Hamaseba, Doura and Motu to Port Moresby (French *et alii*, 1957). It was believed that he had been infected near the Brown or Vanapa rivers, and therefore the serum survey was extended to villages above Doura along the

valley of the upper Vanapa river. Of 18 Goilala natives aged 20 to 30 years, only two had antibody in their serum, and these had both previously visited Port Moresby. Of 38 other natives, mostly children, from the upper Vanapa valley, from Bamuda upstream to Kosipi, only one had serum containing antibody—a male, aged 38 years, from Bamuda.

Domestic chicken sera from these areas in general confirmed the distribution of virus suggested by human sera. In contrast to the high rate of infection among chickens at Kabue, Motu and Doura (Table I), of 46 chickens bled at Bamuda and Hamaseba, only one gave a positive result (at Bamuda).

The picture seems fairly clear—that there was a high density of infection in the rain forest between the Brown and Vanapa rivers near Port Moresby, that this

TABLE I.

Proportion of Sera from the Island of New Guinea with Neutralizing Antibody in Spot Tests Against M.V.E. Virus 1956–1957.

Sources of Sera.	Ages of Humans (Years).				Domestic Chickens.
	2–4	5–9	10–14	15–60	
Kaiapit	—	—	—	4[1]/39[2]	—
Sepik River area ..	2/53	6/95	—	—	21/121
Aramia River area ..	5/6	36/45	7/7	—	12/60
Port Moresby area:					
Kabue, Motu, Doura	5/14	8/11	4/5	42/48	10/17
Galley Reach	1/2	2/15	5/33	12/24	11/108
Tupuserei-Tavai ..	0/41	0/31	1/16	—	5/20

[1]The numerator represents the number of "positive" sera.

[2]The denominator represents the number of sera tested.

infection rate dropped considerably in the adjacent coastal plains just outside Port Moresby, and that the infection did not spread across the Sogeri plateau or to the villages above Bamuda on the upper Vanapa river.

Thirty-one wild birds were shot, and their sera were examined. Most of these birds were taken near the Aramia river, but a few came from the Brown river region. Serological results were not very different from those found near Mildura in southern Australia during 1951 (Anderson, 1953). Sera from the following species were taken in Papua and spot-tested: Little Black Cormorant (*Phalacrocorax sulcirostris*), four positive results in seven examined; Snakebird (*Anhinga rufa papua*), five of eight; Plumed Egret (*Egretta intermedia plumifera*), two of five; Nankeen Night Heron (*Nycticorax caledonicus hilli*), four of seven; Mangrove Heron (*Butorides striata* subsp.), two of two; Pied Goose (*Anseranas semipalmata*) two of two.

Titration of Sera Containing Antibody.

Of the foregoing sera which reacted positively to M.V.E. virus in spot tests, a number were titrated against both M.V.E. and J.B.E. viruses (Table II), by a serum dilution technique.

First, it will be seen that the average titre of antibody against M.V.E. virus in human sera was higher than the average titre in chicken sera.

Secondly, in the Sepik river area and near Port Moresby, the titre against M.V.E. virus was never lower than that against J.B.E. virus, and in general was much higher. Further, in the Sepik river area, of 34 human sera not reacting to M.V.E., none carried antibody to J.B.E. virus. The picture along the Aramia river was somewhat different. Of 16 reacting human sera which were titrated, eight showed higher titres against J.B.E. than against M.V.E. virus, and in four more sera the titres of antibody to M.V.E. and J.B.E. viruses were high and virtually identical.

Controls to these tests involved the titration of sera from guinea-pigs immunized against either M.V.E. or J.B.E. virus. In six guinea-pigs immunized with one or other virus there was the expected preponderance of homologous antibody. In one typical pair, the antibody titres against M.V.E. and J.B.E. viruses were 2000 and 200 for the guinea-pig immunized with M.V.E., and 30 and 2500 for the guinea-pig immunized with J.B.E.

TABLE II.

Titres of Neutralizing Antibody Against M.V.E. and J.B.E. Viruses, in Single Sera from the Island of New Guinea, 1956–1957.

Sources of Sera.	Sera of Children: Against M.V.E./ Against J.B.E.	Sera of Domestic Chickens: Against M.V.E./ Against J.B.E.
Port Moresby area	500/100[1]	250/10
	500/30	50/0
	300/50	30/30
	200/50	20/0
	100/30	5/0
	20/0	—
Sepik River area	300/5	50/50
	200/0	50/10
	50/0	30/5
	15/0	20/5
	—	20/0
	34 other sera at random gave negative results to both viruses.	10/0
Aramia River area ..	600/600	500/20
	500/400	30/0
	500/600	30/5
	300/300	20/10
	200/0	2/5
	150/15	2/5
	50/15	—
	30/10	—
	30/100	—
	30/90	—
	25/30	—
	25/50	—
	20/70	—
	5/100	—
	2/10	—
	2/30	—

[1] Figures are the reciprocals of the serum dilutions which just neutralized 100 LD_{50}. Horizontal pairs of figures apply to the same serum sample. For example, the first child's serum from the Port Moresby area had a titre of 500 against M.V.E. and 100 against J.B.E.; for the second child's serum the titres were 500 and 30; and so on.

Discussion.

Antibody capable of neutralizing M.V.E. virus was found in four widely separated areas of the eastern half of the island of New Guinea—namely, at Kaiapit, in the Sepik valley, along the Aramia river and in the rain forest north of Port Moresby. It is probably significant that each of these areas is close to sea level, and that no antibody was detected in the Highlands.

Mouse-protection tests were used exclusively in the present survey, and these are less subject to cross reactions between related antigens than are hæmagglutinin inhibition or complement fixation tests. Nevertheless, it is recognized that a serological survey alone is not enough to determine the identity of the virus or viruses in any area. Virus isolation provides the only sure criterion.

Within these limitations, it is interesting to speculate on the meaning of the foregoing results. The finding of antibody to M.V.E. virus can reasonably be taken to indicate the presence of at least one group B arthropod-borne virus in the area in the recent past. Japanese B encephalitis virus has been found in Malaya; Murray Valley and dengue have both been isolated from patients in the island of New Guinea itself, and there may be other as yet unknown members of this group in the island.

The comparative titration figures against M.V.E. and J.B.E. viruses fall into two groups. Those from the Sepik valley and the Port Moresby hinterland show much higher titres of M.V.E. than J.B.E. antibody. This may reflect infection by the former virus, a supposition which would be consistent with the previous isolation of M.V.E. virus from a native in Port Moresby.

In the sera from the Aramia river, titres against M.V.E. and J.B.E. were more nearly equal. Of the several possible explanations of this finding, three may be mentioned. First, both viruses may have been present in the one area. Secondly, other Group B viruses may have been responsible for much of the antibody. Thirdly, the natives in the area may show a broader pattern of reaction to M.V.E. (or J.B.E.) virus.

The third possibility is the most attractive to us. Of all the areas visited in the survey, the swamps and rain forest around the Aramia river were certainly the most heavily populated by water birds, and mosquitoes were abundant and bit viciously. In fact, it was because of its preeminent reputation for dense bird and mosquito populations that this isolated and difficult area was visited. The high incidence of antibody in native children in each village would itself suggest either heavy or frequent infections of the area by Group B arthropod-borne viruses.

Repeated injections of antigen into laboratory animals lead to a broader antibody response, and Theiler and Casals (1958) reported that the serological response to yellow fever differed according to whether the patient had previously experienced a group B infection. In those suffering a primary attack, the antibody response was highly specific. In those previously infected with a Group B virus, the neutralizing antibody formed in response to the infection with yellow fever was much more widely active against heterologous Group B strains. It therefore seems feasible that the quality of antibody response detected in the Aramia river natives may have been due to infection with M.V.E. or J.B.E. virus in a population already well immunized by these or other Group B agents.

On this admittedly tenuous basis, it is suggested that the western district of Papua, represented here by the Aramia river area, is one of the most heavily and consistently infected regions of Papua-New Guinea.

In any detailed search for endemic foci of Group B arthropod-borne viruses in the Australasian region, the western district of Papua should have high priority.

Geographically the western district of Papua is Australia's nearest neighbour (Figure I), a bare 100 miles north of Queensland, and across a strait which is dotted with fertile tropical islands. Other studies have tentatively pointed to this section of Australia—northern Queensland and the Gulf of Carpentaria—as an area frequently infected by M.V.E. virus. Lines of flight of birds migrating between Australia and Papua have not been well documented; but ornithological opinion is that considerable migration does take place between western Papua and northern Queensland. It is not difficult to see how this migration would at times ferry M.V.E. or other Group A or B anthropod-borne viruses to and fro between Australia and Papua, and how it could in fact unite western Papua and northern Queensland into one epizootic unit.

Domestic chicken sera have provided valuable information in this study. The short life of chickens and their stationary habitat are obvious advantages in such a survey. In general, the distribution of antibody in chickens coincided with that in humans; but there were two exceptional areas where the proportion of chickens with antibody was higher than the proportion of humans with antibody—in the Sepik district and near Tupuserei. One possible explanation could be based on local variations in vector ecology.

Summary.

Human and domestic chicken sera from Papua and the Australian Trust Territory of New Guinea have been studied for neutralizing antibody to M.V.E. and J.B.E. viruses.

Antibody to M.V.E. virus was found in sera from the rain forest north of Port Moresby, from the Aramia river, from the Sepik area and at Kaiapit in the Markham valley. None was found in the Highlands. Near Port Moresby and in the Sepik Valley, individual sera showed higher titres of antibody to M.V.E. than to J.B.E. virus. This difference was not noted in human sera from the Aramia river area.

Some wild birds captured in Papua carried neutralizing antibody to M.V.E. virus.

Acknowledgements.

The work reported here would have been impossible without the full and enthusiastic cooperation and financial support of the Administration of the Territory of Papua-New Guinea, and of the Public Health Department of the Territory. Dr. J. T. Gunther, Assistant Administrator of the Territory, Dr. R. F. R. Scragg, Acting Director of Public Health, Mr. G. W. Toogood, Assistant Director of the Department of Native Affairs, and Mr. J. Marley, Chief of Division, Animal Industry, gave us every assistance. The Australasian Petroleum Company through the General Fields Manager, Mr. A. F. Longbottom, made available invaluable transport to the Aramia River. We are also most grateful for the warm welcome and ready help given by mission stations and local residents, and by the many field officers in whose districts the survey was done. We wish to mention particularly Dr. C. H. Campbell, Dr. E. M. Craggs, Dr. J. L. Jameson, Mr. P. Kaad, Mr. D. R. Marsh, Mr. A. J. Humphries, Mr. E. Möller, Dr. A. Nemes, Dr. W. Peters, Dr. L. Roth, Mr. A. M. Sinclair, Dr. W. E. Smythe, Mr. H. Topfer, Mr. J. Wakeford and Mr. J. Womersley of Papua-New Guinea, and Professor Sir Edward Ford and Dr. B. R. V. Forbes, of the School of Public Health and Tropical Medicine Sydney. One of the authors (S.G.A.) expresses his thanks for the personal hospitality of Dr. and Mrs. A. V. G. Price.

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EPIDEMIC ADENOVIRUS INFECTION IN A VICTORIAN MIGRANT CENTRE PRESENTING AS PHARYNGO-CONJUNCTIVAL FEVER.

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SINCE adenoviruses were first described by Rowe *et alii* (1953), 18 distinct serotypes have been isolated from humans. Three of these, Type III, Type IV and Type VII, have been most often implicated in epidemic adenovirus illnesses. In America, where the early studies were carried

out, it was found that Type III occurred most frequently in epidemics among children, whereas Type IV and Type VII were more frequently found in epidemics among young adults in military camps.

The most commonly described syndrome due to adenovirus infection in children is pharyngo-conjunctival fever. The illness was named by Bell *et alii* (1955), who extensively investigated an epidemic in a summer camp at Washington in 1954. They isolated Type III adenoviruses from cases and showed the relationship of the isolated viruses to the syndrome. Pharyngo-conjunctival fever may occur sporadically, but is usually an epidemic illness.

Although Type III adenoviruses often have been associated with pharyngo-conjunctival fever; epidemics of a similar illness, pricipally among children, and due to Type VII adenoviruses, have been described from Canada by Doane *et alii* (1957), from England by Tyrell *et alii* (1956), and from Finland by Okerblom *et alii* (1957).

The illness was probably first reported by Derrick (1943), who described in detail three typical cases from an epidemic in Brisbane in 1942.

The present paper describes the clinical features and the laboratory investigation of an epidemic which occurred in a migrant centre in Victoria.

Inflamed ear drums were observed during the course of the illness in seven cases, the inflammation in six cases being unilateral and in one case bilateral. All these children were treated with penicillin with good response, except one child, in whom suppuration occurred.

One patient developed a subconjunctival hæmorrhage which took several weeks to resolve, and one had an epistaxis.

Two patients who had apparently recovered relapsed; an illness of a similar pattern developed in one case after an interval of five days, and in the other case after 19 days.

Epidemiology.

The epidemic occurred amongst migrants from Europe who were living temporarily at a migrant reception centre in north-eastern Victoria. A total of 44 cases occurred. The first case occurred on December 1, 1958, and the last case on January 17, 1959. The first patient had become ill on board ship one day before arrival at Melbourne, and was reported ill two days later. The cases were distributed throughout that time, as is shown in Figure II. There was a build-up to peak incidence during the fifth week and the first half of the sixth week. Forty-two cases occurred in children, while only two occurred in adults;

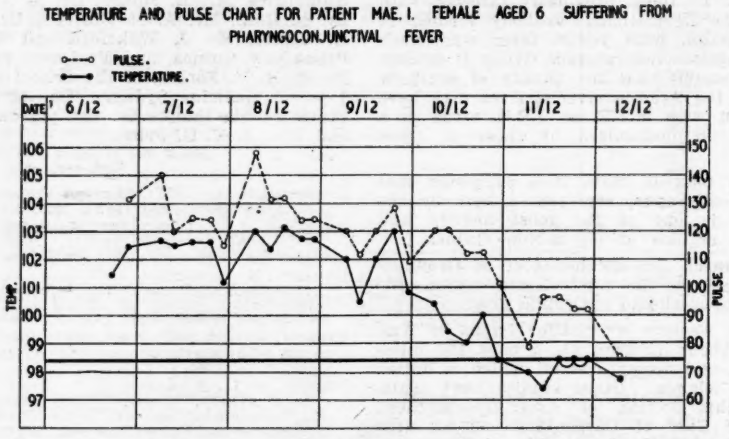


FIGURE I.
Temperature and pulse chart from Case II (female patient, aged six years, suffering from pharyngo-conjunctival fever.)

Clinical Features.

The cardinal features of the illness in all cases were fever, pharyngitis and conjunctivitis.

In most cases the fever lasted for six days, was moderately high and subsided gradually. A typical temperature chart is shown in Figure I. The children appeared more comfortable than would have been expected from their degree of pyrexia. Pharyngitis was marked, and there were enlarged lymphoid follicles on the posterior wall. A mucopurulent exudate could often be seen in the post-nasal space. The pharyngitis persisted while the temperature was elevated.

Inflammation was more marked in the palpebral than the sclerotic conjunctivæ, and often one eye was more severely affected than the other. The sclerotic conjunctivitis faded first, but the palpebral conjunctiva remained red and velvety for a period of up to two weeks after the temperature had returned to normal.

The white cell count was not raised above 10,000 per cubic millimetre in 10 of the 16 cases in which this examination was carried out.

Complications of the primary illness were common, although fortunately they were mostly mild. One patient did develop severe pneumonia which responded to therapy with erythromycin. One patient developed signs of early bronchopneumonia, and two patients developed bronchitis.

of the children, 32 were under the age of four years. Three of the affected children were permanent residents at the centre. The attack rate was higher in the group aged under four years, the 29 cases in migrant children coming from a population of approximately 180, whereas only 10 cases occurred among 420 children aged over four years and under 14 years.

Each block of flats had a common mess hall where all residents took their meals, and this was a common meeting place where all could be exposed to infection by unrecognized cases. All patients were admitted to hospital as soon as the diagnosis was made, to prevent further spreading of the infection, and this appeared to be successful, because new groups of migrants who were presumably susceptible arrived at the centre shortly before the epidemic ended, but were not involved.

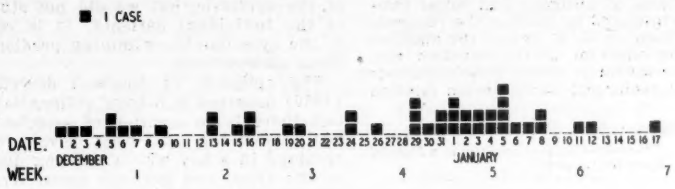
Virus Laboratory Studies.

Materials and Methods.

Specimens for virus isolation were collected during the acute febrile phase of the illness. On 12 occasions specimens were collected during the convalescent phase. Throat washings were collected when the patient gargled Hank's balanced salt solution (B.S.S.) containing penicillin and streptomycin. The samples were then added to bovine albumin to give a final albumin concentration of 0·1%. When the patients were too young to gargle, the throat

was swabbed with sterile cotton-wool pledgets on a wire applicator, and these throat swabs were extracted in 3 ml. of B.S.S. with albumin. Eye swabs were collected by swabbing each eye with a cotton-wool pledget, and this was treated in the same way as the throat swabs. All specimens were kept at 4° C. after arriving at the laboratory, unless it was considered that more than five days would elapse before they could be tested, in which case they were stored at −20° C.

Whenever possible, acute and convalescent phase blood samples were collected and the sera stored at −20° C.



DISTRIBUTION OF CASES IN EPIDEMIC OF PHARYNGO-CONJUNCTIVAL FEVER BY DAY OF ONSET.

FIGURE II.
Distribution of cases in epidemic of pharyngo-conjunctival fever by day of onset.

The specimens for virus isolation were inoculated into screw-capped tubes of tissue cultures containing the "Miles" stable line of human kidney cells. This line of cells was isolated at the Commonwealth Serum Laboratories, and is maintained by weekly passage in a medium consisting of 20% human serum in mixture 199 (Morgan *et alii*, 1955). The tissue cultures for virus isolation were prepared by adding to each tube a suspension of 150,000 "Miles" cells prepared in mixture 199 containing 20% bovine serum, which were then incubated while stationary at 36° C. for 3 to 5 days, after which time there was a confluent growth of cells on the lower wall of the tube. Prior to inoculation with samples, the growth medium was removed and the cells were washed in two changes of 3 ml. of B.S.S. The cells were subsequently maintained in mixture 199 with 5% added bovine serum for 14 days after inoculation, the maintenance medium being replaced at intervals of 3 to 5 days. Before each medium change, a microscopic examination was made for viral cytopathogenic effect, and when this was advanced, the medium was not changed, but the tubes were incubated until complete degeneration of the tissue occurred. The supernatant tissue culture fluids were then passed without freezing into fresh tubes of tissue culture, which were again incubated for 14 days, or until cytopathogenic effect was complete. The viruses contained in the supernatant fluid were then typed for their specific neutralization by type-specific antisera prepared against the prototype strains and supplied by Microbiological Associates.

Neutralizing antibodies in the patients' sera were estimated as follows. Serial fourfold dilutions of sera were mixed with equal volumes of approximately sixty 50% infective doses of a strain of virus isolated at Bonegilla. After standing for at least 1 hour at 4° C., four tissue-culture tubes were

TABLE I.
Laboratory Results in 10 Cases of Pharyngo-Conjunctival Fever in which Virus Isolation and Serological Tests were Performed.

Case Number.	Virus Isolation.			Serological Investigation.		
	Sample Taken.[1]	Isolation of Adenovirus.	Type of Isolated Adenovirus.	Serum Sample Taken.	Antibody Titre.	
					Virus Neutralization.[2]	Complement Fixation.[3]
1	Throat, 9.12.58 Eye, 11.12.58 Throat, 11.12.58 Throat, 2.1.59 (con.)	+ + − −	Type VII Type VII	10.12.58 2. 1.59	4 64	
2	Throat, 3.1.59 Eye, 3.1.59	+ +	Type VII Type VII	3. 1.59 26. 1.59	4 16	5 60
3	Throat, 2.1.59 Eye, 24.1.59 (con.)	+ −	Type VII	3. 1.59 26. 1.59	4 256	5 60
4	Throat, 15.12.58 Eye, 3.1.59 (con.)[4]	− +	Type VII	15.12.58 2. 1.59 26. 1.59	4 4 256	5 5 20
5	Throat, 3.1.59 Eye, 3.1.59	+ +	Type VII Type VII	3. 1.59 26. 1.59	4 16	5 15
6	Throat, 2.1.59	+	Type VII	2. 1.59 26. 1.59	4 16	60 30
7	Throat, 3.1.59 Eye, 24.1.59 (con.)	+ −	Type VII	3. 1.59 26. 1.59	4 64	5 6
8	Throat, 3.1.59 Eye, 24.1.59 (con.)	− −		21.12.58 2. 1.59	4 256	5 60
9	Throat, 27.12.58 Throat, 2.1.59 Eye, 24.1.59 (con.)	+ + −	Type VII Type VII	1. 1.59 26. 1.59	4 16	5 30
10	Throat, 3.1.59 Eye, 24.1.59 (con.)	+ −	Type VII	3. 1.59 26. 1.59	4 16	5 30

[1] "Con."=specimens collected after acute phase of illness.
[2] Titre expressed as reciprocal of serum dilution which neutralized 50% of tubes inoculated with 30 ID_{50} Type VII strain.
[3] Titre expressed as reciprocal of serum dilution at which partial fixation of complement occurred.
[4] Patient had relapse three days after this specimen was collected.

inoculated with each serum dilution. The cultures were maintained for 10 days with several medium changes. The endpoint was assessed as the last dilution at which at least two of the four tubes showed neutralization of the virus. The titre of the serum was the reciprocal of the dilution of the serum at which the partial neutralization occurred.

Complement fixation tests were performed by the use of a micro method based on that described for influenza by Donnelly (1951) and modified for adenovirus antigens. Three 50% hæmolytic doses of complement were used with 3% sensitized sheep-cell suspension as the indicator system. Fixation with optimal dilutions of antigens and serial two-fold dilutions of serum was procured by holding the reagents for 16 hours at 4° C. and 1 hour at 37° C. before the addition of the sensitized cells. The endpoint of the titration was taken as that dilution of the serum at which 50% hæmolysis occurred. The titre was the reciprocal of the serum dilution of the endpoint.

TABLE II.

Virus Isolation Attempts in 15 Cases of Pharyngo-Conjunctival Fever in a Migrant Population at Bonegilla, Australia.

Case Number.	Sample Taken.	Isolation of Adenovirus.	Type of Isolated Adenovirus.
11	Throat, 9.12.58.	+	Type VII
12	Throat, 9.12.58. Throat, 11.12.58	+ +	Type VII Type VII
13	Throat, 9.12.58.	+	Type VII
14	Throat, 15.12.58.	−	
15	Throat, 2.1.59.	−	
16	Pooled eye and throat, 2.1.59.	−	
17	Throat, 27.12.58.	+	Type VII
18	Throat, 27.12.58.	+	Type VII
19	Eye (con.),[1] 4.1.59.	−	
20	Pooled eye and throat, 4.1.59.	+	Type III
21	Pooled eye and throat, 4.1.59.	+	Type VII
22	Pooled eye and throat, 3.1.59. Eye (con.), 24.1.59.	+ −	Type VII
23	Throat, 29.12.58. Throat (con.), 3.1.59.	+ −	Type VII
24	Eye (con.), 24.1.59.	−	
25	Eye (con.), 24.1.59.	−	

[1] "Con."=specimens collected after acute phase of illness.

Results.

From 10 cases a set of throat and eye specimens and acute and convalescent phase sera were available, and the results of tests are listed in Table I. Throat or eye samples from all these cases yielded Type VII adenoviruses. A rise in neutralizing antibody to a strain of virus isolated during the epidemic was found in all cases.

There was a significant rise in complement-fixing antibodies in seven of the nine cases tested. Of the other two, there was a high titre in the acute-phase specimen in one, and in the other there was a slight rise not considered significant, although the test was repeated on several occasions.

An incomplete set of specimens was obtained from a further 15 cases, and results of virus isolation attempts on these are listed in Table II. Adenoviruses were isolated from 11 out of 13 of the patients from whom the specimens were collected during the febrile phase of the illness. In 10 cases the adenoviruses were Type VII and in one case were Type III.

Discussion.

The laboratory results indicate that the epidemic was caused by Type VII adenoviruses. The isolation of Type III adenoviruses from a single patient was noted. It is interesting that there were not more cases due to the Type III virus, as it is also known to cause pharyngo-conjunctival fever in children. Probably, the proportion of children with immunity to that type was high enough to prevent further spread.

Pharyngo-conjunctival fever most commonly occurs in summer, and epidemics are usually associated with the use of a swimming-pool. The association of epidemics with swimming has been observed in America by Bell *et alii* (1955), in Canada by Ormsby and Aitchison (1955), and in Finland by Okerblom *et alii* (1957).

Bathing in the adjacent Hume Weir was a popular pastime with the people living at the centre at the time of the epidemic, but we did not study the bathing habits of the individual patients. It is believed that irritation to the eyes due to swimming predisposes to infection with these adenoviruses.

The epidemic in England described by Tyrell *et alii* (1956) occurred in a boys' residential school during winter, and there is no mention of association with a swimming-pool. However, the most severe case of conjunctivitis occurred in a boy who was being fitted with contact lenses at the time, and perhaps again irritation predisposed to the infection of the conjunctiva by the viruses.

Otitis media was observed as a complication in 7 of our 44 cases. The occurrence of otitis media associated with pharyngo-conjunctival fever was also reported by Bell *et alii* (1955), by Ormsby and Aitcheson (1955), and by Tyrell *et alii* (1956). Whether otitis media in pharyngo-conjunctival fever is due to the adenoviruses or to bacteria is not certain, so that it seems wise to institute treatment with antibiotics when this complication arises. All patients in this series were treated with penicillin; nevertheless, in one case suppuration occurred.

Because in some cases the pharynx or conjunctiva appeared inflamed after the acute phase of the illness when the patient appeared otherwise well, it was thought that a virus carrier state might have persisted, and that convalescent patients might have been still infectious. We tested material from 12 such patients, and from none of these was virus isolated. The one patient from whom viruses were isolated after the primary fever had subsided was one of the two patients in the epidemic who suffered a relapse of the illness. In this particular case, the antibody studies suggest that relapse occurred because of inadequate neutralizing antibody response to the first illness.

The epidemic was a considerable public health problem, involving a total of 414 patient-hospital days. It was feared that the continued arrival of new population groups might keep the epidemic smouldering for a long time. It was considered that vaccination with a monovalent Type VII adenovirus vaccine of the children aged under four years before they arrived at the centre might be valuable. Adenovirus vaccines have been very successful in reducing the incidence of adenovirus infections in military personnel living in barracks in the United States of America (Stallones *et alii*, 1957; Hilleman 1957). However, the epidemic ended spontaneously before the programme was undertaken.

Summary.

An epidemic of pharyngo-conjunctival fever among migrants recently arrived in Australia and living at a reception centre was due to Type VII adenoviruses. The illness occurred mainly in children aged under four years. Factors likely to be of value in controlling epidemics of this nature are discussed.

Acknowledgements.

We are indebted to Dr. L. W. Kernot for his assistance, and to Dr. P. L. Bazeley for his interest and encouragement during these investigations. We express our thanks to the Commonwealth Director-General of Health for permission to publish this paper.

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Reports of Cases.

A TEMPORAL LOBE LESION WITH SECONDARY SUBCORTICAL DISCHARGES IN THE INTERICTAL ELECTROENCEPHALOGRAM.

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IN the electroencephalogram of patients with epilepsy, it is now widely accepted that the distribution of the interictal abnormal discharge is indicative of the localization of the epileptogenic focus responsible for the condition. The first correlation of this sort to be established was that advanced by Jasper and Kershman (1941). They distinguished bilateral synchronous discharges, associated with a "deep-lying central focal pace-maker", and localized discharges, associated with a cortical focus. As to the clinical nature of the accompanying epileptic seizure, they considered that the cortical focus produced the focal cortical seizure previously described by Penfield (1936), and accepted the association between the classical regular three-per-second spike-and-wave type of bilateral synchronous discharge and clinical *petit mal*, put forward by Gibbs, Davis and Lennox (1935), but pointed out that *grand mal*, commencing with loss of consciousness (that is, without an aura) could also occur when this type of discharge was present interictally.

Though the value of this classification is undoubted, it has gradually been realized that modifications must be introduced. Of these, certainly the most important and the one that must constantly be kept in mind is that bilateral generalized spike-and-wave discharges, even of the classical type (Hill, 1956), can be associated with a cortical lesion and the more these discharges vary from the classical form, the more likely this is. This was first pointed out by Penfield and Jasper (1946). At this time these workers considered that, apart from seizures arising centrally, only those due to cortical foci in the anterior frontal region produced initial loss of consciousness. They described three such cases; one was due to a lesion of the lateral surface of the anterior frontal lobe, associated with a localized spike focus in the electroencephalogram; the other two were due to lesions of the medial surface, associated with bilaterally symmetrical discharges in the electroencephalogram. They therefore considered that the anterior portions of the frontal lobes had a "somewhat more direct connection" with the central area producing the generalized seizure types, associated with initial loss of consciousness and bilaterally symmetrical discharges in the electroencephalogram—namely, *petit mal* and *grand mal*.

In 1951, Penfield and Kristiansen pointed out that lesions in other cortical areas, especially, but not exclusively, in the temporal lobes, could also produce seizures characterized by initial loss of consciousness. However, "the importance of the cortical areas on the mesial surface of the hemisphere (pericallosal) in the genesis of seizures which might otherwise be considered of subcortical or nonfocal origin" was still stressed (Tukel and Jasper, 1952). These workers described 31 cases of parasagittal epileptogenic lesions. The electroencephalograms of 26 of these

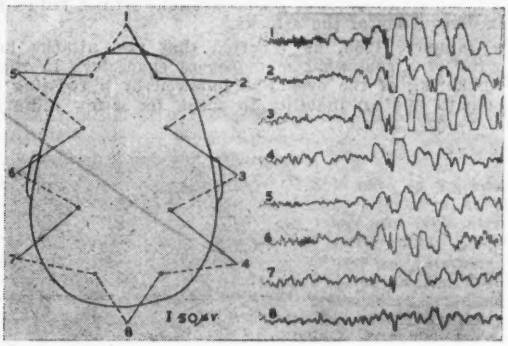

FIGURE I.
Bilateral discharge activity in the electroencephalogram of September 26, 1956, which appeared during hyperventilation. It is atypical spike and wave in form, fairly symmetrical in onset, but containing more spike activity on the right.

patients showed bilaterally synchronous bursts of rhythmic spike-and-wave complexes. However, these bursts were generally irregular in form and frequency, the latter generally varying between 2 and 3·5 per second, but at times from 4 to 6 per second.

Howell (1955) has since described cases of epilepsy associated with electroencephalograms showing the regular spike-and-wave form of classical *petit mal*, yet with a variety of focal cortical seizure types, not merely those showing initial loss of consciousness. This would seem consistent with the view of Hill, who has pointed out that cortical lesions may produce such discharges, without stressing any particular localization. For this condition he has introduced the term secondary subcortical epilepsy (Hill, 1957). However, Howell, though considering the possibility that these seizures could be due to cortical lesions, put forward a second view, possibly derived from Gastaut (1954), that the discharge could arise centrally and project to a localized area of cortex, thus producing a focal cortical seizure.

Gordon (1959) has described a patient who suffered from two types of seizure, one a simple lapse of consciousness, the other a feeling that he knew exactly what was going to happen. His electroencephalogram showed bursts of fairly regular and generalized three-per-second spike-and-wave activity, in which on two occasions isolated spikes focal at the left fronto-temporal region occurred. Presumably, owing to the stress placed by Jasper *et alii* on such seizures and discharges being secondary only to cortical lesions of the mesial surface of the hemisphere, Gordon did not consider the possibility that these findings could be explained by the presence of a single lesion in the temporal lobe, but considered only that there could be two lesions, one central and one temporal, or that the

syndrome was produced by a central lesion acting in the manner suggested by Howell.

In view of the paucity of published cases in which cortical lesions, other than mesial surface ones, have been demonstrated in association with bilateral spike and wave discharges in the electroencephalogram and lapses of consciousness similar to *petit mal*, the present case is described. It is suggested that this supports the view that cortical lesions other than those of the medial surface can produce secondary subcortical epilepsy, and that this view should at least be considered in explaining such findings.

Clinical Record.

The patient was a healthy-looking boy, aged 10 years, when he was first examined in September, 1955. For the previous five months he had suffered from attacks which commenced with a fluttering of the eyelids followed by "a sort of trance", the whole attack lasting only a few seconds and occurring up to six times per day. He had been given small doses of phenobarbitone with a reduction in the frequency of the attacks.

In January, 1956, he reported that two attacks had occurred of a somewhat more severe character. In them the flickering of the eyes was followed by a twisting of the mouth and an inability to speak for a few minutes.

parasaggital antero-posterior bipolar placement produced another burst, less typically spike-and-wave in form, with a fairly symmetrical onset, but containing more spike activity on the right side, shown in Figure I.

In October, 1956, treatment was established on phenobarbitone (65 mg. three times a day) combined with "Mesatoin" (methoin) in a dosage of 100 mg. four times a day. The phenobarbitone produced a good deal of drowsiness, which was not much relieved by the administration of dextroamphetamine in a dosage of 5 mg. each morning.

In January, 1957, the attacks continued irregularly every few weeks. At the onset there was often twitching about the mouth, followed by a trance-like state with inability to speak for perhaps 20 seconds or so.

A further electroencephalogram was recorded on February 1, 1957. This again showed a burst of spike-and-wave activity, less regular in form, but commencing symmetrically. In addition, while the recording was being made in the antero-posterior line above the ears, a polyspike followed by a slow wave appeared, firing regularly at about 1·5 cycles per second. This discharge was generalized, but the spikes were sharper and more prominent at the right mid-temporal electrode, where they were focal. The beginning of this discharge is shown in Figure II. The record was taken at a reduced gain

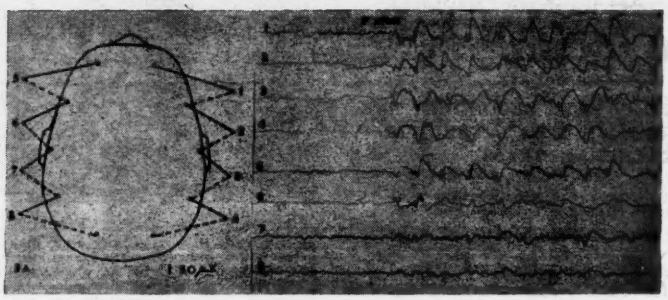

FIGURE II.

Slow polyspike and wave activity, which appeared in the resting record of February 1, 1957. It is considerably more prominent on the right, where the spike activity is at times focal at the right mid-temporal electrode.

In other less severe attacks the flickering of the eyelids might be confined to the right side. It was difficult to decide whether the boy was naturally right-handed or left-handed. A paternal grandfather and uncle were left-handed, but other known relatives were right-handed. The handwriting was remarkably similar whichever hand he used. Physical examination again gave normal results, and treatment consisted in the administration of phenobarbitone (65 mg.) and "Dilantin" (100 mg.) four times per day.

In September, 1956, "Tridione" (300 mg. three times a day) was substituted for "Dilantin". Within a few days the attacks became more severe. The parents reported that there was flickering of the left eyelid at the onset, and now they thought that the twitching of the eyelids had always been bilateral or confined to the left side.

An electroencephalogram was recorded on September 26, 1956. The resting record showed a well-dominant, irregular post-central activity of moderate voltage at 8 to 10 cycles per second, mixed with which was a moderate amount of 6 to 7 cycles per second activity of the same voltage. Both activities were symmetrical and blocked well to eye-opening. On over-breathing with the eletrodes placed in an antero-posterior bipolar arrangement on a line passing just over the ears, a burst of fairly symmetrical and regular spike-and-wave activity at 2·5 cycles per second appeared, lasting 40 seconds. Careful inspection of the tracing showed the discharge to be more prominent on the right at the commencement, and a few spikes appeared only in the right temporal region. Over-breathing on a compared with the previous one, so it is not possible to compare the background activity validly. On over-breathing, bursts of both types of discharge appeared. An air encephalogram was also taken but this was normal. The cerebro-spinal fluid was under normal pressure. It contained no cells, and the total protein content was 45 mg. per 100 ml.

Some improvement followed a change of treatment to "Mysoline" (primidone) in a dosage of 250 mg. four times per day, in combination with the "Mesantoin". However, by May, 1957, the attacks were increasing in frequency, and a trial was made of "Paradione" (paramethadione), in a dosage of 300 mg. four times a day in place of the "Mesantoin". His condition appeared to worsen. At this time it was possible to produce a brief trance by over-breathing, so the clinical resemblance to *petit mal* was close. The exhibition of "Malidone" (aloxidone), "Milontin" (phensuximide) and "Phenurone" (phenylacetyl-urea) seemed to aggravate the epilepsy, with the development of a series of major attacks especially during sleep. "Phemitone" and "Ethotoin" (peganone) did not promote improvement, nor did "Nydrane" (N-benzyl-chloropropionamide), "Diamox" (acetazolamide) and "Cardrase" (ethoxzolamide).

A third electroencephalogram taken on July 30, 1957, showed a much more disorganized background activity in the resting record, compared with that of September 26, 1956. It was dominated by high-voltage, irregular, slow activity at 2 to 6 cycles per second, and there was very little activity in the alpha range. However, a seizure in

the preceding 24 hours could have produced this picture. Two runs of spike activity in the right temporal region were seen, the second being followed by about 10 seconds' suppression, and then 24 cycles per second low-voltage activity appeared in the right frontal region, which increased in amplitude. Anterior temporal spikes were superimposed upon this, first at about 5 per second on the right, but less frequently on the left, where they were followed by slow waves, to appear as 1·5 cycles per second wave-and-spike activity. This discharge was accompanied by a clinical seizure.

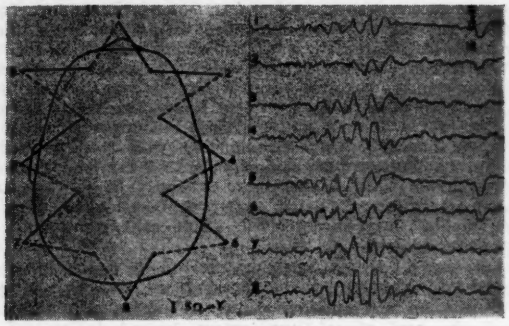

FIGURE III.
Bilateral atypical wave and spike activity, which is fairly symmetrical in appearance, present in the resting record of May 20, 1959.

During 1958 and 1959 his condition continued much as before, the attacks recurring every week or so and sometimes in a series of minor or major attacks. On a few occasions the boy fell heavily without warning, suffering facial abrasions. His school performance gradually deteriorated. Physical examination revealed no abnormality and there was no clinical evidence of a localized intracranial disorder; nor were there any symptoms suggestive of raised intracranial pressure.

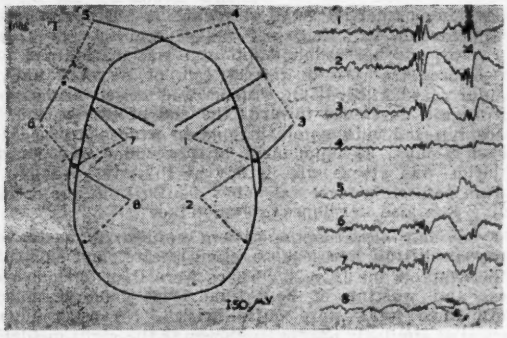

FIGURE IV.
Electroencephalographic recording from sphenoidal placement of electrodes with "Pentothal" activation on May 20, 1959. The high-voltage, multiple sharp spikes characterize the original epileptogenic focus on the right. The mirror focus is seen on the left.

On May 20, 1959 an electroencephalogram was again recorded. Bilateral irregular wave-and-spike activity which was fairly symmetrical was still present, as seen in Figure III. Sphenoidal needles were then inserted and recording continued while "Pentothal" solution (2·5 grammes per 100 ml. of water) was administered intravenously at a rate of approximately 2 ml. per second. Bursts of spikes followed by a slow wave were seen, frequently focal at the mid-temporal region at times only on the right side, but more often on both sides. However, the high-voltage, very sharp spikes were invariably seen on the right side (Figure IV), and no activity was ever seen only on the left side. Barbiturate-fast activity was not very prominent, but seemed diminished at the right sphenoidal needle.

The patient was referred to Mr. F. P. Morgan, and it was decided to perform a right temporal lobectomy in July, 1959. We are indebted to Mr. Morgan for an account of the operative findings.

At operation, the localization of the epileptiform focus in the right mid-temporal region was confirmed by electrocorticograms. The middle temporal convolution appeared broadened and slightly elevated above the remainder of the temporal lobe. Exploration of the temporal lobe revealed a large cystic and solid astrocytoma extending to the temporal pole. The tumour lay above and lateral to the temporal horn of the ventricle, which was moderately enlarged but in normal position. The medial extension of the tumour invaded the insula. The anterior two-thirds of the temporal lobe was resected, and this included probably eight-tenths of the tumour.

The operation was not followed by the appearance of any clinical deficit. The attacks of epilepsy have continued, although they have been less frequent than before. The administration of phenobarbitone and "Dilantin" has been continued.

Discussion.

Apart from the significance of this case as an example of a temporal lobe lesion producing a seizure at times apparently identical with *petit mal* and an interictal electroencephalogram containing subcortical discharge patterns, there are additional features of interest. The value of obtaining an exact description of the epileptic seizure is again confirmed. The presence of symptoms of a cortical seizure—movements of the mouth at the onset of the attack and inability to speak after consciousness was recovered—indicated the likelihood of a cortical lesion and, indeed, strongly suggested its localization in the dominant temporal lobe. It was unfortunate that in this patient the laterality of the dominance could not be established.

The necessity for considering the possibility of a cortical focus even when the electroencephalogram contains bilateral discharge patterns is also indicated. Of course, this is especially the case when the discharge is not of the classical 2·5 to 3·5 cycles per second pattern, and such discharges should be carefully examined for evidence of spike asymmetry, particularly at their onset. All the electroencephalograms from this patient showed such evidence of the localization of the epileptogenic focus. The value of using as a routine a placement of electrodes over the temporal lobe when recording while the patient is hyperventilating is also evident—the first record showing spike asymmetry only in this placement.

Another feature of interest is the "mirror focus" in the left temporal lobe, seen in the sphenoidal recording (Figure IV). This type of focus was first described by Penfield and Jasper (1954). They found that spikes appeared in the homologous area of the opposite hemisphere when an experimental epileptogenic lesion was produced at a point on the cortex with alumina cream. They considered that these spikes were transmitted by commissural pathways, and pointed out that generally, as in the present case, the spikes from the primary focus were of much higher voltage, more rapid and slightly preceded the mirror focus spikes, and were not all transmitted.

The absence from the electroencephalogram of irregular slow activity over the temporal tumour is noteworthy, and is presumably explained by the slowly-growing and infiltrative nature of the lesion. A final point of interest is that on the three occasions on which diones ("Tridione", "Paradione" and "Malidione") were used to treat this patient his condition appeared to worsen. Though on the first two occasions other anti-convulsants were reduced coincidently with the exhibition of the diones, the impression was formed that this was insufficient to explain the degree of deterioration in the control of the epilepsy which resulted, and it was considered that the diones had a positive

harmful effect. That the diones are of value only in true *petit mal* and that they often increase the incidence of *grand mal* is generally accepted; but whether this is so only when the *grand mal* is secondary to a cortical lesion does not seem to have been established. However, it certainly would seem that failure of epileptic lapses to respond to diones should make one suspect that these seizures are, in fact, cortical.

Summary.

A case in which a temporal lobe lesion produced seizures at times apparently identical with *petit mal* and an interictal electroencephalogram contained subcortical discharge patterns is described, and its relevence to present theory regarding the production of subcortical discharges by cortical lesions discussed.

The importance of considering the possibility of the presence of a cortical focus, even when the electroencephalogram shows subcortical discharge patterns, is indicated as is the necessity for examining such discharges for the presence of asymmetry.

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MUSCLE WASTING COMPLICATING TREATMENT WITH DEXAMETHASONE.

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MUSCLE WASTING and weakness, usually with preservation of tendon reflexes, was first described as a complication of treatment with the steroid 16-alpha-hydroxy, delta 1, 9-alpha-fluorohydrocortisone (triamcinolone) (Freyberg *et alii*, 1958; Dubois, 1958; Kendall and Hart, 1959; Williams, 1959). MacLean and Schurr (1959) reported a case developing during treatment with 9-alpha-fluorohydrocortisone. More recently, Perkoff *et alii* (1959) have reported five cases developing during the daily administration of at least 40 mg. of delta-1-cortisone (prednisone), and two cases developing during the daily administration of 150 mg. and 250 mg. respectively of cortisone. They have called the condition steroid myopathy. The cases reported have occurred in patients being treated for collagen diseases, asthma, rheumatoid arthritis and blood dyscrasias. A case is here reported of muscle wasting and weakness following long-term administration of the steroid 16-alpha-methyl, delta 1, 9-alpha-fluorohydrocortisone (dexamethasone) during the treatment of temporal arteritis.

Clinical Record.

The patient, a woman, aged 75 years, presented on January 29, 1959, with a five months' history of tiredness, pallor, intermittent shooting pains in the limbs, and swelling of the feet, legs and hands. For six weeks she had also been troubled by severe stabbing pains in both temporal regions, where reddened tender swellings had been observed, and by blurring of vision. These symptoms had been relieved by the administration of cortisone tablets for one week. She had been treated at intervals for anæmia over the preceding five years, but had had no other serious illnesses.

Examination showed her to be a pale, frail, old woman with koilonychia. Both temporal arteries were tender and tortuous, and nodules were palpable along the left one. There were no changes in colour in the overlying skin. A clear view of her fundi could not be obtained because of bilateral cataracts; some narrowing of the arteries was present. There was no evidence of arthritis and no muscle wasting, and weakness was evident only in the grip of both hands. Her temperature was normal, her weight was 44·2 kg., and her blood pressure 110/60 mm. of mercury. Investigations showed that her hæmoglobin value was 8·5 grammes per 100 ml. and that the erythrocytes were hypochromic. Biopsy of the left temporal artery was reported by Dr. J. D. Hicks to show in the media the characteristic giant-cell granulomata of temporal arteritis.

She was transfused with blood to bring her hæmoglobin value to 12·4 grammes per 100 ml. From February 12 to March 6 an attempt was made to control her temporal headache and visual impairment by administration of phenylbutazone in a dosage of 200 mg. three times a day, but there was no appreciable relief of the headache and her erythrocyte sedimentation rate did not fall below 88 mm. per hour. Her blood pressure rose to 140/75 mm. of mercury and her weight to 46·2 kg. during this period, by the end of which she had œdema of both legs and her jugular venous pressure was raised 5 cm. After a single intramuscular injection of 2 ml. of mersalyl she had a diuresis, with fall in jugular venous pressure to normal, disappearance of œdema and fall in weight to 42·5 kg.

From March 6, treatment was begun with dexamethasone, and for the next four months, until July 23, she took 3·0 to 3·5 mg. daily. This dose gave and maintained relief from her headache and visual impairment, and she complained of recurrence of temporal headache and blurring of vision at each attempt to reduce it. Her erythrocyte sedimentation rate fell, and ranged from 3·0 to 23 mm. per hour, and her hæmoglobin value was maintained. Her blood pressure rose to 150/90 mm. of mercury and her weight to 49 kilograms. Œdema and raised venous pressure again developed towards the end of this period, and were relieved with chlorothiazide in a dosage of 500 mg. twice a day. A supplement of 1 gramme of potassium chloride was given twice a day at this time, though the serum potassium level was below 4 mEq/l. on one occasion only. She also developed a "moon-face".

From May onwards the patient noticed increasing difficulty in lifting her legs to climb stairs, and mentioned this symptom on July 23. There were then obvious weakness and wasting of both quadriceps femoris muscles. Both knee jerks were quite brisk. No other muscles appeared similarly affected. Biopsy of the right quadriceps femoris muscle was performed on August 4 and reported by Dr. J. D. Hicks as showing mainly normal muscle fibres, but with patchy proliferation of sarcolemmal nuclei and loss of cross striation. There was no interstitial cellular infiltration, and no specific changes were observed in small interstitial arteries.

The weakness and wasting were thought to be due to the dexamethasone, the dosage of which was gradually reduced to 1 mg. per day until August 7, when prednisolone (5 mg. per day) was substituted. The dosage of this was further reduced to 2·5 mg. per day, initially without untoward effect. However, during the next five months a daily dose of 15 mg. of prednisolone was found necessary to prevent recurrence of temporal headache, malaise and blurring of vision, and to maintain her erythrocyte sedimentation rate within normal limits. Her blood pressure

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ranged up to 140/75 mm. of mercury, and her "moon-face" gradually became less obvious. It was found necessary to continue chlorothiazide in a dosage of 500 mg. twice a day to prevent a rise in jugular venous pressure and œdema. Her serum potassium content ranged from 4·3 to 5·4 mEq/l. without a potassium supplement. While receiving prednisolone, she thought that the weakness of her quadriceps femoris muscles gradually became less. However, examination showed that obvious weakness and wasting of the quadriceps persisted.

Comment.

Temporal arteritis is regarded as an indication for steroids in dosage adequate to suppress symptoms and maintain a normal erythrocyte sedimentation rate, both because it relieves symptoms and because of the danger of blindness if the ophthalmic arteries become involved. Phenylbutazone was tried initially in this case because of the claim (Björkman, 1958) that it may lead to rapid relief of symptoms and may subsequently be discontinued without risk of relapse. However, it proved ineffective.

Dexamethasone is said not to cause appreciable sodium retention (Slater *et alii*, 1959), though in this case the development of œdema and raised venous pressure, relieved by chlorothiazide, suggested that it did so when a dose equivalent in anti-inflammatory effect to about 100 to 125 mg. of hydrocortisone (Hart *et alii*, 1959; Slater *et alii*, 1959) was given for four months.

It is believed that the quadriceps femoris weakness and wasting in this patient represent a side effect of dexamethasone, because they developed during the administration of the drug and the weakness was gradually relieved after its withdrawal, because they resembled the weakness and wasting of muscles sometimes seen with other steroids, and because there was no other apparent cause. At no time were serum potassium levels of an order likely to be associated with muscle weakness observed, and the onset of the weakness occurred when the patient's primary disease was in clinical remission.

In all reported cases of steroid myopathy the weakness and wasting have been reversible with cessation of the causative steroid. It is possible that the prednisolone at present being given is preventing the complete reversal of the myopathy in this patient. In most reported cases the quadriceps femoris muscles have been involved early and severely; but a more extensive distribution, involving the proximal muscles of all limbs and limb girdle muscles, may occur also (Kendall and Hart, 1959; Williams, 1959; MacLean and Schurr, 1959; Perkoff *et alii*, 1959). When biopsy of affected muscles has been reported, the histological findings have been variable and sometimes relatively normal (Williams, 1959; MacLean and Schurr, 1959; Perkoff *et alii*, 1959), as in this case.

Summary.

A case is reported of weakness and wasting of both quadriceps femoris muscles complicating the prolonged administration of dexamethasone to an elderly woman with temporal arteritis.

Acknowledgements.

I am indebted to Professor R. R. H. Lovell for his help in the preparation of this report, and to Dr. J. D. Hicks for the biopsy reports.

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PHÆOCHROMOCYTOMA—REPORT OF A CASE WITH INTERESTING ASPECTS.

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IN November, 1958, a woman, aged 42 years, was admitted to the Prince Henry Hospital, Sydney, in a collapsed and gravely ill condition. The only history available at this time was that she had developed a severe headache two days previously, associated with intractable vomiting and profuse sweating. On her arrival in the ward, it was noted that she was a spare woman, lethargic, sunken-eyed and very dehydrated. There was generalized brownish pigmentation of the skin, which felt cold and clammy and had lost its elasticity. The extremities were cyanotic. The pulse was barely perceptible at the wrist, and the heart rate was 120 per minute, the rhythm being regular. The blood pressure was 80 mm. of mercury systolic, the diastolic pressure being unrecordable. The heart appeared normal in size on clinical examination. There was no neck stiffness and no evidence of tetany. No pigmentation of the buccal mucosa was seen. On the skin of the body and limbs, however, were a moderate number of neurofibromata. The urine at this time contained an albumin deposit of one-third.

The diagnosis was thought to be renal failure due to chronic nephritis or pyelonephritis with severe electrolyte disturbance. Addison's disease was considered, but was thought to be less likely.

As the patient was in peripheral circulatory failure, due, apparently, to acute salt and water depletion, an intravenous infusion of isotonic saline and human albumin was immediately started and allowed to run as rapidly as possible. During the ensuing 24 hours, 4 litres of isotonic saline were given intravenously, and also 2 litres of fluid orally, as vomiting by this time had subsided. Her condition steadily improved, the blood pressure rising gradually to 130/80 mm. of mercury, and later to 160/105 mm. of mercury.

It was learnt that the patient had been subject for many years to attacks of severe headache lasting about 12 hours, occurring once or twice a year. During the last three years, however, headaches had become more frequent, and had been followed a few minutes after onset by very forceful palpitations described as "hammering", which seemed to spread up to the throat. During 1958, headaches were occurring daily, and some of the attacks were associated with vomiting. The patient invariably awoke in the morning with headache. She also complained of attacks of sweating and of feeling hot, which she attributed to her age. However, her menstrual periods had been regular and normal. She discovered in October, 1958, that she had lost nearly one stone in weight despite a normal dietary intake. She had been treated in hospital twice for "kidney trouble" during pregnancy, the first time for six weeks before confinement and the second time for three weeks *ante partum*. In 1952, biopsies of skin nodules were taken, and the diagnosis of neurofibromatosis was confirmed.

The diagnosis of Addison's disease, which had been considered among others on her arrival at hospital, was held to be untenable when the blood pressure rose to mildly hypertensive levels and the serum electrolyte concentrations at the time of her admission to hospital were found to be normal. Chronic nephritis as the cause

of the illness was ruled out when the blood urea content, which at the time of her admission was 85 mg. per 100 ml., fell with the correction of dehydration to 25 mg. per 100 ml. and the albuminuria disappeared. Microscopic examination of the centrifuged deposit of urine obtained by catheter revealed only occasional epithelial cells, and the urinary specific gravity varied from 1002 to 1024.

Her condition improved satisfactorily, although the pulse rate remained between 100 and 130 per minute for two weeks and she complained of frequent sweating. At no time, however, did she exhibit emotional lability or experience apprehension or alarm. The basal metabolic rate was found to be +23%. In view of the history of weight loss despite a normal appetite, sweating, persistent tachycardia and the raised metabolic rate, a diagnosis of thyrotoxicosis was made. She left hospital three weeks later taking anti-thyroid drugs.

Four weeks later she awoke in the night with a severe headache, hammering in the chest and vomiting. Immediate admission to hospital was arranged. This time her blood pressure was 220/140 mm. of mercury and her pulse rate 112 per minute. The skin was cold and clammy. The optic fundi appeared normal. The next day, after rest and sedation, the blood pressure was 130/80 mm. of mercury and the pulse rate 120 per minute.

The fact that the patient presented on this second occasion with a similar clinical picture to that on the first admission, but with pronounced hypertension, suggested the true diagnosis. Furthermore, in view of the curious history, the marked lability of the blood pressure and the other associated features, a phentolamine ("Regitine") test was done, and also an estimation was made of the 24-hour output of catecholamines in the urine.

The intravenous injection of 5 mg. of phentolamine caused an alteration of the blood pressure from 210/130 to 160/95 mm. of mercury within four minutes. The excretion of catecholamines in the urine during 24 hours was found to be from 1100 to 1500 μg., the normal maximum daily output being about 150 μg. A random blood sugar estimation (non-fasting) was made, and the figure of 125 mg. per 100 ml. was obtained. The blood lactate concentration was 23 mg. per 100 ml. (venous blood), the normal range being 5 to 20 mg. per 100 ml.

A plain X-ray film of the abdomen and an intravenous pyelogram suggested the presence of a rounded soft-tissue mass at the upper pole of the right kidney, which was lower in position than the left. As the X-ray appearances were convincing, it was decided not to carry out presacral perirenal insufflation to outline the suprarenals radiologically, but to explore the right adrenal gland surgically.

After premedication with morphine and atropine, a smooth induction of anæsthesia was obtained with "Pentothal" and scoline (Dr. B. Crawshaw), and endotracheal intubation was carried out. The blood pressure, which was 170/110 mm. of mercury before induction, rose after intubation to 230/130 mm. of mercury. Phentolamine given intravenously controlled this and subsequent hypertensive peaks, which occurred after the injection of tubocurarine, or whenever the tumour was handled or pressed upon.

The approach to the right adrenal gland (Dr. J. McNamara) was made via a Reid's incision, through the bed of the twelfth rib, with removal of that rib and excision of the necks of the ninth, tenth and eleventh ribs on the right side. A very large pulsating suprarenal mass could be felt, densely adherent to the bare area of the liver and tucked high up between liver and diaphragm. It was estimated to be about 6 in. long. The arterial supply was ligated with a resulting reduction in size of the tumour by about one-third. Difficulty was experienced in freeing the tumour from its attachments and in controlling hæmorrhage from the large draining veins, of which there were two, each larger in diameter than the renal veins and about 5 to 6 mm. in length. Rapid blood transfusion was required at this time, as the blood pressure fell alarmingly.

With the isolation of the tumour, the blood pressure fell precipitately again, and nor-adrenaline in 5% glucose solution (2 mg. per litre) was run in through a second infusion. There followed an anxious 20 minutes of hypotension until the blood and nor-adrenaline infusions restored a satisfactory blood-pressure level. Altogether 2 litres of blood were given. Nor-adrenaline was required for only six hours after operation, and the patient's blood pressure stabilized itself at 130/80 mm. of mercury. Convalescence was complicated only by a moderate hydropneumothorax on the right side, which resolved spontaneously.

Estimation of the 24-hour excretion of catecholamines in the urine three days after operation showed an output of 90 μg. Six weeks after operation the patient felt well, and had had no palpitations or sweating and only an occasional dull frontal headache. The blood pressure was 115/75 mm. of mercury, and the urinary catechol excretion at this time was 100 μg. in 24 hours. Similar findings have been recorded at subsequent visits up to the present time. In view of this it seems very likely that there is no other abnormal source of pressor amines.

The tumour itself weighed 375 grammes and was 10 cm. in diameter. Macroscopic examination showed it to be a circumscribed, highly vascular cystic structure, with areas of hæmorrhage and necrosis. Histological study showed the typical pattern of adrenal medullary tumour (phæochromocytoma), with extensive areas of hæmorrhage and necrosis.

Discussion.

Among a number of interesting features in this case, the most dramatic from the clinician's point of view was the mode of presentation—the patient presenting in a state of profound circulatory collapse. This was probably an example of "adrenaline shock", complicated in this case by acute salt-water depletion due to intractable vomiting and drenching sweats. The similarity in appearance of this patient on admission to hospital to that described by Terry *et alii* (1958) is obvious.

It has been found that the prolonged infusion of pressor amines is followed in man and animals by a period of hypotension (Blacket *et alii*, 1950; Green *et alii*, 1948). Compensatory physiological mechanisms favouring hypotension apparently produce the drop in blood pressure when the rate of pressor amine infusion is stopped or abruptly decreased.

At the time of the patient's first admission to hospital, an adequate history was unobtainable. Even when the patient had improved sufficiently to give more detail, she was found to be of surprisingly sanguine temperament considering the nature of the tumour, and an adequate history was only gradually brought to light. It was surprising that even during the most violent adrenaline storms she did not experience any sensation of apprehension or panic.

The second admission, at the height of a hypertensive attack, suggested the correct investigations to be carried out.

The reasons for the severe vomiting may well have been multiple. It is possible that an abrupt rise in intracranial pressure, coupled with spasm of the pylorus due to adrenaline, was the main factor involved.

The history of morning headache, vomiting and palpitations is interesting. Presumably these symptoms were induced by the increased muscle tone and activity occurring on awakening, with consequent pressure on a fully loaded tumour. The patient could not remember the symptoms being induced by her bending forward or straining. Headache is probably the commonest symptom in cases of phæochromocytoma. It is readily understandable how patients with this condition can be regarded for years as suffering from anxiety neurosis. Certainly paroxysmal or persistent hypertension associated with paroxysmal headaches, sweating attacks and severe palpitations, with a sense of oppression or pain in the chest, especially in a young, thin person with hypermetabolism in the absence of other evidence of thyrotoxicosis, should prompt investigation for suspected phæochromocytoma.

The skin pigmentation caused some difficulty in diagnosis, as it could have been racial in origin or due to chronic renal disease, Addison's disease, neurofibromatosis or thyrotoxicosis. It is said that neurofibromatosis is associated in about 5% of cases of phæochromocytoma. Glushien *et alii* (1953) found in his series, curiously, that the left adrenal was affected more frequently when neurofibromatosis was associated, whereas in patients without neurofibromatosis, the right adrenal was favoured about twice as often as the left. These findings are of little real help in determining which is the affected adrenal in the individual case.

This tumour compared very favourably in size with those reported in the literature. The usual weights reported are from 1 gramme to 75 grammes, the world record being 2000 grammes, including the contained cystic fluid (Borch-Johnsen, 1937).

The investigation of patients suspected of phæochromocytoma and the problems of surgical treatment and anæsthesia will not be dealt with in this report. When the diagnosis has been established, surgery should never be delayed without very good reason.

Acknowledgements.

I wish to thank Dr. James Isbister, under whose care the patient was admitted to hospital, for his permission to publish the details of the case and for his advice; Dr. John McNamara, who performed the operation, for the surgical details; Dr. B. Crawshaw, who was the anæsthetist, for the relevant information and Dr. R. Bartholomew, Ph.D., who estimated the catecholamines.

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Reviews.

The Year Book of Cancer (1958-1959 Year Book Series). Compiled and edited by Randolph Lee Clark, jnr., B.S., M.D., M.Sc. (Surgery), D.Sc. (Hon.), and Russell W. Cumley, B.A., M.A., Ph.D.; 1959. Chicago: The Year Book Publishers. Sydney: W. Ramsay (Surgical) Limited. 7½" × 4¾", pp. 570, with 202 illustrations. Price: 88s.

THIS is the most ambitious of the Year Book series, in that it attempts to collect in one volume abstracts of work in many different disciplines. The final editing is again in the hands of R. L. Clark and R. W. Cumley; but this book is a remarkable example of cooperative effort, in that they are assisted by an editorial board of 128 members—a list including many of the best-known names in American cancer research as well as a sprinkling of names from other countries—whose contributions are collected by the several sectional chiefs. The resulting collection of 298 abstracts, with appropriate editorial comments, presents a remarkably comprehensive survey of the published literature dealing with many aspects of cancer work. The editors mention that a special effort was made to obtain reports of outstanding and representative work being done on cancer in non-English-speaking countries. The bias is towards the practical side. The editors indicate that they are not concerned with controversial studies which are not of immediate practical import, but that it is their aim "to furnish a panorama of progress in cancer care and a vista of the possibilities for future developments . . . for the busy physician, the career cancer worker and the dentist". The first two-thirds of the volume consists of abstracts arranged according to the systems of the body, with a special chapter on cancer in children. Then follow chapters on pathology and cytology, Röntgen diagnosis, chemotherapy, hormone therapy, reconstruction and rehabilitation, advanced tumours and terminal care, epidemiology, biochemistry, physics and radiobiology, bacteriology, immunology and virology, and general animal tumours. This volume should have perhaps the widest appeal of all the Year Book volumes, for it provides a valuable source of references for workers in many different departments, as well as a wide selection of important information for the general medical reader.

The Year Book of Neurology, Psychiatry and Neurosurgery (1958-1959 Year Book Series). "Neurology", edited by Roland P. Mackay, M.D.; "Psychiatry", edited by S. Bernard Wortis, M.D.; "Neurosurgery", edited by Oscar Sugar, M.D.; 1959. Chicago: The Year Book Publishers. Sydney: W. Ramsay (Surgical) Limited. 7½" × 5", pp. 624, with 107 illustrations. Price: £4 13s. 6d.

As in the preceding volume, this book is divided into three self-contained sections, "Neurology" edited by R. P. Mackay, "Psychiatry" edited by S. B. Wortis and "Neurosurgery" edited by O. Sugar. In his introduction to the first, Mackay states that without much question the most significant developments of the year were in the field of the neurotropic viruses; vigorous research since 1949 has culminated in a new concept of the "enteroviruses", all inhabiting the intestinal tract, and possessing various degrees of immunological relationships and varying tendencies to attack the nervous system. He notes that reports of the effects of immunization against acute poliomyelitis with the Salk vaccine are coming in from many areas and are essentially unanimous in citing 75% effectiveness against paralysis. He also notes vigorous study of the convulsive disorders, several studies of the effects of radiation on the nervous system, and the fact that multiple sclerosis continues to be one of the most actively studied of human diseases.

In the introduction to the section on psychiatry, Wortis notes an increased number of publications in nearly all branches of the subject. He gives a list of some new drugs, in the early stages of clinical evaluation, with appropriate references, and 11 pages of references to papers and books not abstracted in the pages that follow arranged in various groups. Editorial notes to the abstracts in the body of this section mainly take the form of references to further papers on the subject.

Introducing the section on neurosurgery, Sugar states that "astounding advances have not occurred this year in neurologic surgery". He notes that interest continues to be most marked in hibernation and allied techniques as surgical adjuncts, in the reduction of swelling in the brain by means of intravenously administered urea, in the use of hibernation in the treatment of head injuries, in hypophysectomy for control of metastatic cancer; and in vascular grafts for occlusive disease. He states that interest in Russian medical literature continues to mount, and lists the contents of some recent Russian periodicals and books in his subject.

The abstracts which form the main substance of this volume provide a comprehensive review of published literature in these subjects during the year under review, and their preparation and production conform to the high standard which we have come to expect of the Year Book series.

Proceedings of the World Congress of Gastroenterology and the Fifty-ninth Annual Meeting of the American Gastroenterological Association, Washington, D.C., U.S.A., May 25th through 31st, 1958. Volumes 1 and 2, 1959. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 10" × 6¼", pp. 1364, with many illustrations. Price: £11.

THE two volumes of the proceedings of the World Congress in Gastroenterology, held in Washington in May, 1958, contain an imposing collection of contributions on all important branches of the subject from a generous selection of the world's leading gastro-enterologists. As such, they can hardly fail to be an important mine of information and reference source for all workers in this field. In the chairman's foreword it is stated that the great number of authoritative participants in the Congress made it possible to develop symposia of great importance and worldwide interest, and the hope is expressed that the published account may become a standard reference work for information on racial, geographic and national differences in epidemiology and in clinical behaviour patterns of disease. Beside the

large number of original contributions, symposia were held on the following subjects: "Epidemiologic and Clinical Features of Peptic Ulcer Disease Throughout the World", "Malabsorption Syndrome", "Nutrition and its Effect on the Liver and Pancreas", "Intestinal Infections and Infestations", "Education of the Gastroenterologic Internist with Particular Emphasis on the Future in this Field of Medicine", "Gastric Carcinoma". The last 170 pages are devoted to the fifty-ninth annual meeting of the American Gastroenterological Association, the host organization of the Congress. The proceedings of the American Gastroenterological Association included a series of papers on liver studies, symposia on the pancreas, on methodology and on the intestines, and panel discussions on bilirubin metabolism and regional enteritis. Most of the papers in these two volumes appear to be published in full. The many skiagrams and photomicrographs are excellently reproduced.

Fear, Punishment Anxiety and the Wolfenden Report. By Charles Berg; 1959. London: George Allen & Unwin, Limited. 8¼" × 5¼", pp. 128. Price: 20s. (English).

REDUCED to its essentials, the late Charles Berg's principal criticism of the compilers of the Wolfenden Report is not their failure to make adequate legal recommendations in regard to homosexuality, but their lack of understanding of their own attitudes, defensive mechanisms and biases. Thus, he suggests that the recommendations they made were governed by emotionally determined thoughts belonging to the familiar category of good or bad. Dr. Berg's analysis is, therefore, given largely in terms of the personality dynamics of those responsible for the Report. While acceptance of the author's arguments is likely to be governed by the reader's particular doctrinaire bias, some at least of his conclusions appear inescapable. In occasional instances, however, he shows a tendency to make generalizations from particular instances. The validity of these is on less certain ground.

Of particular interest is the author's analysis of the motives underlying punishment. This, while not wholly original, is a lucid exposition of a matter reaching far beyond the confines of homosexuality; it is of great potential interest to all who experience dissatisfaction with society's present attitude towards and methods of dealing with those who transgress the law.

The analysis of the Wolfenden Report occupies only one-third of the text, the remainder being concerned largely with the author's theories and personal modifications of the psychodynamics of anxiety. In dealing with the fundamental nature of anxiety he makes what he calls "a phylogenetic excursion into biology". Drawing on this, he is then able to synthesize several conflicting views. Even if the reader cannot accept all the author's propositions, this may be fairly said to be a stimulating book, which can be recommended to students of human behaviour.

Cates' Primary Anatomy. By J. V. Basmajian, M.D.; fourth edition; 1960. Baltimore: The Williams and Wilkins Company. Sydney: Angus & Robertson, Limited. 10" × 6½", pp. 372, with 514 illustrations. Price: 71s. 6d.

THIS is an elementary book designed for students taking an unspecialized course in human anatomy at the college or university level. Courses of this kind are common in America, and are taken by students of nursing, physical or occupational therapy, physical education, honours biology, etc. Elsewhere such students usually undergo a more professionally orientated anatomical education.

The material is arranged systematically, and most of the emphasis is placed on the locomotor system, which is the chief object of study of many of its intended readers. However, every system is treated in some detail. The 514 diagrammatic illustrations serve their purpose well, and many are outstanding of their kind. The text is clear and simple, and the selection of material has been admirably made to suit a hypothetical student interested in elementary human anatomy. The format, printing and binding are alike good; the index works.

There remains the problem of whether students with diverse professional interests and needs should be exposed to a uniform course of this nature. The occupational therapists, for example, would find little profit in memorizing the branches of the splenic artery, and those involved in physical education will later have little traffic with the distribution of the glosso-pharyngeal nerve. Conversely, those studying human anatomy as an end in itself would probably prefer to use a larger and more detailed text from the outset. This problem is a universal one, and to state it implies no criticism of this book which is, as its fourth edition testifies, a most useful introduction to anatomy.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Praktische Operationskunde und Instrumentenlehre", by Harro Seyfarth, Prof. Dr. med. habil., and Elly Jaeger; 1960. Jena: VEB Gustav Fischer Verlag. 9½" × 6½", pp. 464 with 214 illustrations and 4 tables. Price: Not stated.

"Klinisches Lehrbuch der Physikalischen Therapie", by Prof. Dr. J. Grober; 1960. Jena: VEB Gustav Fischer Verlag. 9½" × 6½", pp. 456 with 276 illustrations. Price: DM 37.75 (German).

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The Medical Journal of Australia

SATURDAY, SEPTEMBER 10, 1960.

THE WORLD HEALTH ORGANIZATION IN 1959.

THE basic problem of our time, according to the Director-General of the World Health Organization, Dr. M. G. Candau, in his introduction to the latest WHO Annual Report,[1] is to help raise the living standards of nations which are still in the early stages of technological and economic development. A great many informed people will agree with Dr. Candau. There are other major problems, especially international political strife with its constant threat to issue in open war, which press hard upon the peoples and nations of the world, but they tend to be in various guises the problems of every age. Never before has there been the same opportunity to lift the underdeveloped peoples into their rightful place beside their more fortunate fellows. Nor has there been the vision to attempt this, the confidence in its possibility, or the same awareness of the dire consequences of not doing it. Health activities, with the breadth of meaning that the term has today, have a large and significant role to play in this context, and all honour must be paid to the World Health Organization for the way in which it has approached its responsibility here and for the amount that it has accomplished. A great deal was done in 1959, as recorded in this report, and Dr. Candau states that by the end of the year there was a growing conviction, both in Member States and in the various WHO bodies, that the Organization could not only cope with the tasks for which it had been created, but could also successfully attack some of the problems which had emerged recently and which would have a definite bearing on the social and economic evolution of our fast-changing world. In pursuit of these responsibilities, it is clear from the report that the Organization gave a wide range of assistance to countries throughout the world during 1959, both directly in the form of projects adapted to particular needs and through international technical services of the more traditional type.

Pride of place in the report is given to the world-wide malaria eradication campaign which appears to have been WHO's first love in recent times. Remarkable and commendable progress has been made in this formidable undertaking, tactics being adapted to the circumstances of particular areas. It is pointed out that although world-wide malaria eradication practically started only three years ago, the amount of knowledge that has now been accumulated is greater than in any other field of health, and the programmes in operation form an area covering all the continental malarious countries of the Americas, Europe and South-East Asia. The one really disturbing fact, which seriously threatens the future of this promising project, is the shortage of money to carry it on. Despite the most strenuous efforts contributions are still inadequate, and Dr. Candau states that 95·3% of what is coming into the malaria eradication special account is still from one country alone, the United States of America. He points out that the majority of the other contributors are economically underdeveloped countries, some of them with the lowest income per head in the world, and most of them already spending considerable sums on their own malaria eradication projects. Further progress will depend solely on the willingness of governments to contribute to the special account and to organize national campaigns soliciting financial cooperation of their citizens individually and in groups.

In the field of communicable diseases in general a great deal has been done. Attention is being increasingly directed to the treponematoses. Over one hundred million people still live in low-prevalence yaws areas in tropical countries, and there has been a disturbing recrudescence of syphilis in many countries. Studies and investigations are being pursued to ensure that the most effective assistance can be given to countries attacking these problems, as well as to those (15 out of 22 countries surveyed) in which the incidence of gonorrhœa is increasing. Attention is being paid to tuberculosis, notably in relation to a study in Madras in 1959 on the domiciliary care of tuberculosis patients, to various aspects of the problem of leprosy, to bilharziasis and to the zoonoses. WHO was one of the sponsors of an important conference in 1959 on the use of experimental live attenuated poliovirus vaccines, and in the autumn of 1959 made an evaluation of the extensive field studies undertaken with live poliovirus vaccine in the U.S.S.R. Further progress has been made towards the goal of eradicating such communicable diseases as yaws, endemic syphilis and smallpox.

Public health services are being expanded and improved everywhere in the world today, although there is wide variation in the level of achievement between countries. WHO has given its encouragement and assistance in many ways in the year under consideration, and this not least in the training of nurses and midwives and of teachers of health workers. During the year the ten-thousandth WHO Fellowship for studies and observations abroad was awarded. The highlight in the approach to the problem of environmental sanitation was a programme for the improvement of community water supplies. Work was intensified on the mounting problem of insect resistance. The health aspects of ionizing radiations and radioactivity and the related problems of human genetics came under review.

In the field of medical research, one of WHO's most recent and most interesting ventures, two major developments took place. The twelfth World Health Assembly approved an over-all plan for WHO's intensified research programme in the years to come, and in the autumn of 1959 the Advisory Committee on Medical Research met in Geneva to provide the Director-General with the necessary guidance on future activities. Dr. Candau states that as a result of these two developments it is now clear that from a global point of view the major task for international research activities will have to remain the communicable diseases, with priority to be given to the study

[1] "The Work of WHO 1959: Annual Report of the Director-General to the World Health Assembly and the United Nations", Official Records of the World Health Organization No. 98, March, 1960. Geneva: World Health Organization. 11" × 8¼", pp. 283, with illustrations. Price: 10s. (English).

of viruses and of the diseases prevalent in tropical countries. For the highly industrialized countries the first objectives are the chronic diseases and particularly cancer and cardio-vascular troubles. Nutritional problems must also remain basic subjects of investigation, and continued interest is essential in the problems of the increased risk of exposure of man to ionizing radiations, as well as the possible effect of these radiations on generations unborn. Dr. Candau points out that in evaluating the progress made by WHO in the field of medical research, one has to keep in mind the fact that the world-wide medical research programme under inter-government auspices is a development for which there is no precedent. Useful as some of the established national patterns of central research organization have proved in this respect, it has also been found that many are not easily applicable to the international scene. Therefore, in addition to building up the scientific programme, WHO has had to develop the necessary organizational framework and the administrative patterns for the new undertaking. By the end of 1959 all this preparatory work had been completed, and WHO seemed sufficiently prepared to launch the intensified programme of medical research which has become one of its major responsibilities.

International organizations are a recognized target for the darts of the cynic, and the pessimist looks at them with a dull eye, not without justification in some cases. The World Health Organization, on the other hand, has come under very little fire in its essentially international work, and its growth in size and prestige is based soundly on achievement. At the end of 1959, it had a membership of 87 Member States with three associate members. It had a total staff of 1968 people of 63 nationalities, 38 expert advisory panels and an effective working budget for the year of $15,000,000. The only criticisms that have been seriously levelled at the World Health Organization arose when it showed a tendency to move into fields affecting medical practice and aspects of national health and medical services which most countries regard as domestic policy. In so far as it has in more recent years confined its activities and its unique resources to a relatively restricted, though still extensive, field, it has grown in effectiveness and respect. Today WHO must be acknowledged as an indispensable and constructive world agency, providing one of the bright spots on a heavily clouded international scene.

Current Comment.

TEACHING AND RESEARCH IN AVIATION MEDICINE.

TEACHING and allied research in aviation medicine, both for the Royal Australian Air Force and for civil aviation in Australia, have been coordinated by the formation of the R.A.A.F. Institute of Aviation Medicine at the R.A.A.F. Base, Point Cook. According to a recent statement by the Minister for Air, the Honourable F. M. Osborne, the Institute incorporates the R.A.A.F. School of Aviation Medicine and the Aero-Medical Research Laboratory, which is at the University of Adelaide. The Institute will be under administrative control of the Officer Commanding Point Cook, within R.A.A.F. Support Command.

Research projects and schedules will, however, be supervised and largely authorized by the Institute's committee of management. This committee consists of the Professor of Physiology in the University of Adelaide, Professor R. F. Whelan (chairman), the Director-General of Medical Services, R.A.A.F., Air Vice-Marshal E. A. Daley, C.B.E., the Commanding Officer of the Institute, Squadron Leader W. J. Bishop, the Director of Aviation Medicine of the Department of Civil Aviation, Dr. John Lane, and the Assistant Director, Dr. Lloyd Buley. Specialist officers in flying and engineering may be coopted as required. The Aero-Medical Research Laboratory has been incorporated as a civilian section of the Institute, but will still remain at the Department of Physiology, University of Adelaide. Its operating costs will be shared equally by the Departments of Air and Civil Aviation.

In the past, the R.A.A.F. School of Aviation Medicine was the training centre in aviation medicine for the Air Force, while research activities in this field were undertaken by the Aero-Medical Research Laboratory, and by the Aircraft Research and Development Unit of the R.A.A.F. based at Laverton, as well as by the R.A.A.F. School of Aviation Medicine. In the future, the Aircraft Research and Development Unit will continue to cooperate with the Institute in activities involving aviation medicine and research, particularly in their practical application to operational flying and ground requirements. It will provide the flying support needed by the Institute. On the Institute's training side, courses will include basic administration and aviation medicine for medical officers and nursing sisters, casualty aeromedical evacuation, pressure suit instruction, oral surgery and medicine, and tropical and Antarctic survival. Courses will also be held for medical orderlies, hygiene inspectors, pathology technicians and others. The training of aircrew and others in aviation physiology will be a very important part of the Institute's work, not only for R.A.A.F. personnel, but also for civil medical examiners of the Department of Civil Aviation, airline personnel and others whose work in aviation requires such knowledge and training.

HEALTH IN ASIA AND THE WESTERN PACIFIC.

THE Epidemiological Intelligence Station in Singapore has reported outbreaks of pestilential diseases in most of the traditional Asian reservoirs of plague, cholera and smallpox during the past year. The fact that these diseases still pose a threat to the whole world is brought out by the fact that several of the outbreaks occurred in towns and cities near international ports and airports. The Epidemiological Intelligence Station at Singapore is one of the administrative branches of WHO in the Western Pacific Region. The latest report of its activities, covering the period from July 1, 1959, to May 31, 1960, is contained in the amended report of the WHO Regional Director, Dr. I. C. Fang, which was reviewed at the eleventh annual session of the WHO Regional Committee held recently in Manila.

According to the report, plague was reported from Viet-Nam (15 cases, one death), Burma (116 cases) and India (42 cases). While no cases of plague occurred in ports and airports during the period under review, several international travel centres in India and Pakistan reported outbreaks of cholera. Altogether, India reported 14,830 cases of cholera in 1959 and 1277 cases during the first four months of 1960. East Pakistan reported 20,000 cases of cholera in 1959 and 5700 cases for the first four months of 1960. No cases of cholera occurred in the countries of the WHO Western Pacific Region. Yellow fever is still being kept away from Asia, but it was reported for the first time from Sudan, which during the last quarter of 1959 had 120 cases with 88 deaths. The number of cases of smallpox in 1959 showed a sharp decrease: notifications from countries throughout the world gave a total of about 72,000 cases in 1959 compared with 242,000 cases in 1958. The reduction occurred mainly in India and Pakistan. In the Western Pacific Region smallpox was reported only from Cambodia (one case), Korea (one case) and Malaya (47 cases with 9 deaths).

The Regional Director's annual report brings out some important points. The eradication of smallpox from the Western Pacific Region is now being vigorously pursued; assisted by WHO, Cambodia has undertaken a national eradication campaign, mass vaccination is also in progress in Vietnam, and in the Republic of Korea it is expected that 7,000,000 people will be vaccinated by the end of this year. The concept of malaria eradication has been accepted by most governments in the Region, but some countries and territories have not yet completed their plans of eradication. With one exception, all countries and territories of the Region, in which yaws is endemic have undertaken yaws projects, and the results of mass campaigns and subsequent surveys have been most satisfactory. There has been a growing understanding of the concept of selective rather than compulsory and total segregation of those affected with leprosy, and of domiciliary rather than institutional treatment, but some authorities have been reluctant to bring legislation into line with scientific advances. Most countries in the Region now have programmes for training nurses and midwives, and the response to recruitment is rapidly improving. There is an increasing awareness of the relationship between nutrition and the whole pattern of people's life, a relationship amply demonstrated in the WHO-sponsored socio-anthropological studies carried out in the Federation of Malaya and Tonga. More countries are now turning to WHO for assistance in nutrition. A global community water supply programme proposed by WHO has been received favourably by governments in the Region, and it is expected that greater attention will be devoted to the provision of safe drinking water in the coming years. During the period covered by Dr. Fang's report (12 months to June 30, 1960) approximately 100 WHO-assisted health projects were in operation in the Western Pacific Region. WHO also assisted in improving public health by awarding fellowships, training national health teams, assigning lecturers to medical schools and organizing seminars and study tours.

ACTINOMYCIN.

DURING the last few years the chemotherapeutic approach to the treatment of disseminated malignant conditions has been receiving much attention, both in the experimental field and in clinical trials. Though few have yet achieved an established place in therapy, the known anti-tumour agents are rapidly growing in number and variety. Among these agents, actinomycin D is one that receives frequent mention, and the report[1] of a conference on "The Actinomycins and their Importance in the Treatment of Tumours in Animals and Man", held recently under the auspices of the New York Academy of Sciences, is therefore of considerable topical interest. As its name suggests, actinomycin started out as an antibiotic, and was in fact relatively early in the field, having been isolated in 1940 from a soil actinomycete fungus, which was subsequently named *Streptomyces antibioticus*. It is strongly active against Gram-negative organisms, but was soon found to be too toxic for clinical use in infectious conditions. However, its toxicity against mammalian cells is selective, and further investigation showed that it might have valuable cancericidal properties. Subsequently, a variety of other actinomycins have been isolated from other species of *Streptomyces*, and the family is now a very complicated one. The naturally occurring actinomycins have been labelled A, B, C, D, etc., but each consists of a variety of chemical entities, also variously designated. The position is further complicated by the fact that the chemical composition of the actinomycins produced by any particular species of fungus can be modified by varying the composition of the medium in which it is grown. Chemically, the actinomycins are a group of chromopeptide substances which differ only at one site in the peptide portion of the molecule. Professor H. Brockmann of Göttingen has reported the total synthesis of one of them (actinomycin C_2).

[1] *Nature (London)*, 1960, 186: 4727 (June 4).

The naturally-occurring actinomycins which have so far received most attention are actinomycin D, which has been extensively investigated in America, and actinomycin C, a German preparation. Actinomycin D is the subject of a recent annotation in *The Lancet*[2]. From this and from the report of the New York Conference it appears that actinomycin D is more effective against tumours in children than in adults, and has been used most successfully in cases of Wilms' tumour with metastatic spread, both alone and in conjunction with radiotherapy. Both reports mention the marked potentiating effect of actinomycin D when combined with radiation therapy. This effect must be carefully watched as it can lead to serious reactions, and actinomycin is capable of reactivating, in distribution and amount, the skin and mucous membrane reactions produced by previous irradiation. Actinomycin D by itself may produce marked toxic reactions, which usually do not appear till the course of treatment is over. *The Lancet* concludes that actinomycin D may have a place in the treatment of disseminated Wilms' tumour and other metastatic sarcomas in children, and also that it may be of value in certain cases in producing sufficient shrinkage in the primary tumour to make surgical removal possible, and for its potentiating effect with radiotherapy.

Perhaps the most extensive clinical trial yet reported is that carried out by C. T. C. Tan and her colleagues,[3] who have described their experience with actinomycin D in 111 children with metastatic cancer. These authors administered actinomycin D alone (though most of these patients had previously received extensive X-ray or other therapy) and in combination with radiotherapy. They used it in a wide range of conditions, including Wilms' tumour (38 cases), neuroblastoma (20 cases), rhabdomyosarcoma and bone sarcoma (12 cases each). The best response was obtained in cases of Wilms' tumour and of the lymphomas (Hodgkin's disease, reticulum cell sarcoma, lymphosarcoma). Good objective response was noted in six out of 16 patients with Wilms' tumour who were treated with actinomycin D alone. One patient was alive and well, without evidence of recurrence, two years after treatment, though there was evidence of pulmonary metastases when treatment was first given; this patient received a daily maintenance dose of actinomycin D, administered orally, for a period of 18 months. It is notable that this did not appear to inhibit physical growth. Tan and her colleagues used actinomycin D by both oral and parenteral routes. However, only about 5% of the dose is absorbed when actinomycin D is administered orally, and in most cases toxic effects are too severe to permit adequate dosage when it is given by this route. Parenterally, actinomycin D was administered as a course of five daily injections, each equivalent to 15 mg./kg. of body weight. Some patients received up to five or more such courses over a period of several months.

Information on actinomycin C so far comes mainly from Germany. In the report on the New York conference it is stated that it has an almost selective cytostatic effect on lymphatic tissue, and that its clinical use is therefore limited to cases of Hodgkin's disease and chronic lymphatic leukæmia. In one series referred to, remission occurred in 22 out of 54 patients with advanced Hodgkin's disease, refractory to other treatment, but such remissions are short-lived. Actinomycin C is stated not to produce depression of bone marrow, which makes it particularly suitable for trial in cases of aleukæmic Hodgkin's disease and chronic lymphatic leukæmia, but it does have other severe toxic effects.

The actinomycins are evidently an interesting group of antimitotic agents, though whether they will ever have an important role in the treatment of metastatic cancer remains to be seen. Certainly much work remains to be done before the possibilities of the group will have been fully explored, and, whatever the outcome, the study of this group is making important contributions to our understanding of the role of antimitotic substances in the treatment of cancer.

[2] *Lancet*, 1959, 2: 900 (November 21).
[3] *Pediatrics*, 1959, 24: 544 (October).

Abstracts from Medical Literature.

RADIOTHERAPY.

Radiation Therapy in Cancer of the Larynx.

S. T. CANTRIL (*Amer. J. Roentgenol.*, January, 1960) points out that early cancers of the vocal cord may be suitably treated by either surgery or irradiation. The results obtainable by radiotherapy are comparable with those of surgery, with the added possibility of less impairment of voice. The principal role of radiation therapy in laryngeal cancer should be to reduce in so far as possible the necessity for laryngectomy. The author reviews the total experience at certain centres known for interest in cancer of the larynx (in England, Denmark, France, Uruguay and U.S.A.) and notes that, of all patients treated, more than two-thirds survived without laryngectomy when radiation was the principal method of treatment or was used to a degree comparable with surgery. In those patients the extent of whose disease would otherwise require laryngectomy if treated surgically, radiation therapy has accomplished a very significant reduction in the necessity for laryngectomy without jeopardizing survival. However, experience has shown the inability of irradiation to cope successfully with some recognized complications of the disease. The most common of these are: (i) invasion or necrosis of thyroid or cricoid cartilage; (ii) significant subglottic extension; (iii) immobility with œdema of the arytenoid process due to spread of the cancer. In cases in the last group where fixation is due to inflammation, irradiation may be justified as the initial procedure. The number of cases in which laryngectomy may be avoided will increase with earlier diagnosis and closer collaboration between the laryngologist and the radiotherapist.

Total Thoracic Irradiation with Injection of Autogenous Marrow.

K. A. NEWTON (*J. Fac. Radiol.*, January, 1960) points out that the limiting factors in large volume radiotherapy are the constitutional tolerance of the patient, local tissue tolerance, and hæmatological tolerance. It has been stated that when large volumes of tissue are irradiated constitutional tolerance is reached long before local tolerance is approached. The blood counts of patients undergoing wide field radiotherapy have been carefully watched, and irradiation of the thorax produces maximal lowering of both the total white cell and lymphocyte counts. The bone marrow has been found by one writer to be aplastic after doses of 2000 to 3000*r*; and a hypocellular marrow may persist in some cases for many years after irradiation, which can be interpreted as a lack of ability of the body to repopulate its own hypocellular marrow spaces. Reinfusion of autogenous marrow may be done with the object of repopulating these spaces. There are two possible methods of doing this. The first is to aspirate the patient's marrow, to store it at —79° C., and then to reinject the thawed marrow intravenously on completion of treatment. The second method involves the aspiration of marrow from unirradiated areas at the end of a course of X-ray therapy, and then to reinject it intravenously after suitable processing. This is the simplest method. One disadvantage is that it may be unwise to subject a patient to a general anæsthetic immediately after irradiation of the entire thorax. The persons suitable for total thoracic irradiation are those with pulmonary metastases from radiosensitive primary tumours. The author refers to seven cases of this type in which such treatment has been given, and in five of the seven it appears that successful repopulation has been achieved either by stored or fresh marrow cells. It is suggested that if total thoracic irradiation is to be attempted the total dose to the tissues should not exceed 2500*r* and the daily dose should not exceed 150*r*.

Follow-Up Study after Irradiation of the Anterior Mediastinum in Infancy.

E. A. CONTI *et alii* (*Radiology*, March, 1960) have conducted a study to obtain further information concerning the incidence of malignant disease in children treated with X rays in infancy. The irradiated children in this series are of particular interest in that most of them had thymus glands of normal size. In this respect they differ from children in other surveys. The survey covers 1564 children in Pittsburgh given X-ray treatment to the thymus gland as a routine between 1938 and 1946. In 224 children, the diagnosis of enlarged thymus gland was made at birth; 80% of these were irradiated with 200 to 450*r* at 140 kilovolts. Of the 1340 children with thymus glands of normal size, 95% were given 150*r* through a similar small field 4 by 4 cm. The families of 89·6% of the treated children were questioned about the medical histories of these children, and also of their untreated sisters or brothers—2923 in number. No case of malignant disease was found in the treated group, although four cases of cancer, including one of leukæmia, would be expected to occur in a group of children of this size and age distribution. In the group of brothers and sisters there were four malignant tumours, including one case of leukæmia, which compares closely with the expected number. Because of the absence of information for 10% of the treated children, it is difficult to compare the incidence of malignant disease in this group with that in the general population. Nevertheless, it seems likely that the incidence of cancer and leukæmia in the treated children is not greatly increased over the expected incidence.

RADIOLOGY.

Pyelography in Renal Disease with Hypertension.

L. F. SQUIRE AND J. U. SCHLEGEL (*Radiology*, December, 1959) state that in certain cases of hypertension the disease is related to renal disease, may be curable if recognized before the heightened pressure becomes fixed, and probably depends on relative renal ischæmia of still viable parenchyma. It is now possible to select some cases of renal hypertension which are curable by removal or repair of the guilty kidney tissue. Studies in a series of hypertensive subjects showed that in many instances the excretory pyelogram appeared normal, although function on one side was known to be depressed. The radiologist must realize that, in pyelography, in spite of the appearance of good and equal density on both sides, he may in fact be looking at two kidneys of very different functional capacity, one of which is doing as much as ten times the work of the other. In reporting on such a pyelogram, he may unintentionally imply equal function, leading to abandonment of further investigations. Although it is probable that few actually rely on the intravenous pyelogram as an index to function, the authors believe that most radiologists and the practising clinicians whom they serve are unaware of the wide functional difference which may exist between two kidneys with apparently normal pyelograms. Some type of obstructive arterial disease is usually present in such cases. Conditions in which there has been a return of normal tension after operation are: aberrant arteries, renal artery aneurysm, embolism, thrombosis, the presence of plaques or intimal proliferation, constriction of arteries in scar tissue secondary to trauma and pyelonephritis. The authors state that where no known contraindication exists, aortography should be performed in cases of hypertension in addition to differential kidney function tests. Such studies often indicate depression of function on one side in the salvageable patient, when all other means of discovering unilateral renal disease have failed. They also establish the functional state of the good kidney, without a knowledge of which nephrectomy should never be undertaken.

The Post-Gastrectomy Dumping Syndrome.

H. L. DUTHIE AND N. J. MCKELLAR (*Brit. J. Radiol.*, March, 1960) discuss their findings in a radiological study undertaken to investigate bowel mobility after partial gastric resection with particular reference to the "dumping" syndrome. Rapid emptying of the stomach was found with equal frequency in patients with and without symptoms, and four patients with symptoms had relatively slow emptying. The cessation of gastric emptying with the onset of symptoms in three patients supports the contention that stretching of the gastric stump is an important factor in producing "dumping" attacks with no evidence of hold up in the gastric remnant. It has also been suggested that hypermobility of the small intestine is a causative factor in the production of "dumping" symptoms. The results in this study indicate that greatly increased bowel activity can occur in patients without symptoms. On the other hand, hypermobility was invariably noted in patients with "dumping" symptoms after gastrectomy. The hypermobility of the small bowel was not abolished by lying down, in which position "dumping" symptoms did not occur. Hypermobility of the large bowel was seen almost exclusively in patients with "dumping" symptoms. The osmotic effect of a hypertonic meal in the lumen of the gut has been considered the cause of "dump-

ing" symptoms. In the present investigation the administration of a "Raybar-glucose" meal was followed by a lack of definition and the presence of fluid levels in an equal proportion of patients with and without "dumping" symptoms. The association of lack of definition of the small bowel and hypermobility is shown by the results following the ingestion of the "Raybar-glucose" meal. Additional support comes from the studies with cooled "Raybar", for with this material blurring of the small bowel pattern occurs only when hypermobility is present. These two groups of findings suggest that an osmotic factor is not the main cause of the loss of detail in the small bowel, but indicate that the loss of definition of the small bowel pattern may well be due to dispersion of the meal and to failure of absorption of fluid resulting from hypermobility rather than to addition of secretions from the bowel wall.

X-Ray Diagnosis of Gastric Ulcer.

I. E. KUSH (*Gastroenterology*, July, 1959) makes an investigation into the reliability of radiological diagnosis of benign gastric ulcer. The most important question is the frequency of the error of diagnosing gastric carcinoma as benign ulcer. A study of 100 consecutive proved cases of gastric carcinoma shows that an accurate pre-operative X-ray diagnosis was made in 81%. Of those not correctly diagnosed, most (seven cases) were simply not seen. Only one case was considered to be a benign gastric ulcer on pre-operative X-ray examination. If the surgeon or pathologist is unable grossly to distinguish benign ulcer from cancer it should not be assumed that the radiologist is necessarily bound to make the same error.

Venous Changes in Central Brain Tumours.

N. A. LEWTAS (*Clin. Radiol.*, April, 1960) states that in the diagnosis of cerebral tumours by serial angiography it has been found helpful to examine not only arterial and pathological tumour circulation but also the venous circulation. This latter can be divided into two parts—firstly the superficial veins draining into the longitudinal and transverse sinuses, and secondly the deep veins—these latter are of great significance in the diagnosis of deeply placed masses. The deep veins consist of the thalamostriate vein, the septal vein, the internal cerebral vein, the vein of Galen and the deep basal vein. As with ventricular displacements in air studies, venous displacements follow logically from the anatomical site of the lesion. Peripheral masses produce general displacement of the deep veins *en bloc*, the normal contours being maintained. Central lesions situated near these veins produce local deformities of their outline. Furthermore, the drainage veins of a tumour are frequently seen to be abnormally dilated, even in tumours which show no visible pathological circulation. The author concludes that venous changes must be evaluated in relation to the appearances of both arterial and capillary phases, and one must be willing to ignore small or doubtful venous anomalies if these are the only abnormal findings and are inconsistent with the clinical features. However, in cases where diagnosis is doubtful on arteriograms, small venous changes may contribute final and convincing evidence of the presence of a tumour, and may make it possible to avoid the more formidable investigation of ventriculography. This applies in particular to masses disposed centrally and posteriorly. Finally, venous changes may give important information regarding both the operability and the prognosis of tumours—thus local deformities of the deep veins may indicate central extension of peripheral tumours which would make complete removal impossible.

Pulmonary Manifestations of Staphylococcal Pyæmia.

D. R. HAY (*Thorax*, March, 1960) discusses the radiological appearances occurring in staphylococcal pyæmic pulmonary disease. The earliest radiological signs consist of oval or round low density shadows situated peripherally, usually in the middle zones of the lungs. The diameter of the opacities may range from 0·5 to 1·5 cm., and only one may be visible in the first skiagram. Interpretation may be difficult when such solitary lesions are present, but almost invariably a second film taken within one to four days will reveal further lesions or a slight increase in size of the shadows. In the presence of a history suggestive of staphylococcal septicæmia these minor lesions are most significant and may point to the correct diagnosis. In subsequent skiagrams progression of the pulmonary disease is more often revealed by the appearance of new lesions than by the increase in size of the existing ones. In occasional patients the infarcts are more confluent. The development of "cavities" or cysts has been noted in several cases. These are round or oval, thin-walled, air-containing lesions, about 1·5 cm. in diameter, situated at the periphery of the lung in close relation to the pyæmic infarcts. Fluid levels are rarely seen. Ultimately these "ring shadows" disappear with almost no residual abnormality. The lesions are thought not to be reactive cavities but to develop as the result of regional obstructive emphysema secondary to the acute inflammatory process around the pyæmic infarcts. Sometimes the small cysts may coalesce to form large bullæ which may rupture and cause a pneumothorax. Pleural effusion develops occasionally but is usually only a trace at the costo-phrenic angle.

Acute Pyogenic Infections of the Spine in Children.

A. E. PRITCHARD AND W. A. L. THOMPSON (*J. Bone Jt Surg.*, February, 1960) state that the early diagnosis of acute pyogenic osteomyelitis of the spine is often difficult and review the cases of six children with this condition. In the early stages of the disease localizing physical signs may be absent and radiographs may show no obvious abnormality. The onset is acute, with high temperature and toxæmia. Backache is complained of but is poorly localized; depending on the level of the lesion, the pain may radiate into the chest or abdomen or occasionally into one of the limbs. The spinal muscles are in spasm and there may be a scoliosis. There may be a flexion contracture of the hip joint due to irritation of the psoas. There is tenderness in the erector spinæ muscles and pain on percussion of the vertebræ involved and those adjacent to them. If there is an abscess the pus usually spreads anteriorly and laterally. If the infection is in the thoraco-lumbar region the lateral spread of pus may suggest a subphrenic or perinephric abscess, whereas a lower thoracic focus may produce a pleural effusion. Radiographic examination may show elevation of one or both sides of the diaphragm and perhaps an abscess shadow suggestive of subphrenic pus. The spine is radiologically normal at first, but after about three weeks, or earlier in very young children, areas of destruction appear on the contiguous margins of the involved vertebræ, together with patchy osteoporosis of their bodies. The crescentic vertebral erosions appear rather behind the mid-line of the bodies. Later, the intervertebral space narrows, and finally, in the healing phase, there is dense sclerosis of the adjacent margins of the vertebræ. The site of the vertebral erosions corresponds to the position of the neucleus pulposus in the intervertebral disc. Their position raises the question of whether the inflammatory changes start in the nucleus and spread thence, causing necrosis of the vertebræ by pressure.

Cavernous Hæmangioma of Striated Muscle.

E. R. HEITZMAN JR AND J. B. JONES (*Radiology*, March, 1960) state that hæmangiomas of striated muscle are not rare and are often misdiagnosed. Since X-ray changes suggestive of the diagnosis are found in as high as 73% of cases, a review of these changes has been undertaken to emphasize the importance of radiological examination of these lesions. The majority of the tumours are present at birth, but may remain asymptomatic until late childhood or early adult life. Most of those which produce symptoms do so before the age of 30 years. They seem to be somewhat more common among females. Hæmangiomas of skeletal muscles have a predilection for sites distal to the elbow and knee. The most common symptoms, in order of frequency, are the presence of a mass, pain, swelling and cosmetic change. The mass may alternately increase and decrease in size, pain often being noted with enlargement. The reason why these tumours produce pain is not well understood. The mass may enlarge and change colour when the part is dependent. Pulsations and bruits are rare. Phleboliths are the most commonly encountered radiological finding, occurring in 49% of reported cases. A number of phleboliths in X-ray films of areas where there is normally no plexus of veins indicates an abnormal collection of venous channels and is virtually pathognomonic of a venous angioma. The second common X-ray finding in cavernous hæmangioma of skeletal muscle is calcification of the tumour. Bone erosion is seen in some cases of striated muscle hæmangioma located close to bone. In these instances erosion may be related to changes in volume as the tumour fills with and empties of blood. Periosteal new bone formation is seen in a small percentage of these tumours.

Clinico-Pathological Conferences.

A CONFERENCE AT SYDNEY HOSPITAL.

A clinico-pathological conference was held at Sydney Hospital on April 21, 1959. DR. H. M. WHYTE was in the chair. The principal speakers were DR. B. P. BILLINGTON, Honorary Assistant Physician, and MR. P. H. GREENWELL, Honorary Assistant Surgeon.

Clinical History.

A single woman, aged 53 years, came to hospital in December, complaining mainly of jaundice. In March she had had three attacks of severe chills lasting one to three hours. Later she thought that her urine was dark and her motions were pale, but when she consulted a doctor early in May because of weakness, tiredness, loss of appetite and nausea, no jaundice was noticed, and tests of her urine for urobilinogen and bilirubin gave negative results. She was treated with "Largactil" (36 tablets in 26 days) till jaundice was apparent. However, her sister said that she had noticed jaundice at the beginning of May. Other symptoms disappeared with the treatment. The jaundice then fluctuated, but persisted; the urine remained dark; the motions were pale for several months, and then became brown; and pruritus developed. She had several rigors. At no time had she abdominal pain or vomiting, nor had any particular foods upset her. In June the serum bilirubin content was 13·9 mg. per 100 ml., and her serum alkaline phosphatase content was 44·5 units. Over the past year she had lost over 20 pounds in weight. She knew of no contacts with jaundice, and she had received no injections or transfusions of blood. Some months previously she had taken "Butazolidin" tablets for a period. At the age of five years she had had a fever followed by jaundice. There was no relevant family history.

On her admission to hospital, the patient was found to be well nourished and moderately jaundiced, with scratch marks and linear xanthomata on the palms. The liver was not tender, but smooth and enlarged to the width of three fingers below the rib margin. Her blood pressure was 210/120 mm. of mercury, and a harsh systolic bruit was present over the whole cardiac area. A faint cloud of albumin, and bilirubin but no urobilinogen, were found in the urine. The stools were of normal colour.

The results of some investigations were as follows: serum protein content, 6·4 grammes per 100 ml. (albumin 2·8); serum bilirubin content 11·3 mg. per 100 ml.; direct positive Van den Bergh reaction; thymol turbidity, 2 units; zinc sulphate turbidity, 9 units; serum alkaline phosphatase content, 130 units; serum cholesterol content, 950 mg. per 100 ml.; total serum lipid content, 1850 mg. per 100 ml.; serum amylase content, 5 units. Electrophoresis showed the serum proteins to be as follows: albumin plus alpha-1, 44%; alpha-2, 14%; beta, 15%; gamma, 27%. Examination of the blood showed some macrocytosis and anisocytosis; the hæmoglobin value was 12 grammes per 100 ml.; the leucocytes numbered 18,800 per cubic millimetre (69% being neutrophils); the erythrocyte sedimentation rate was 97 mm. in one hour; the prothrombin index was 77%. The response to Casoni's test was negative. The urinary loss of urobilinogen was 2·6 mg. in 24 hours. No blood was found in the fæces on three occasions. No abnormalities were seen in X-ray films of the chest and abdomen. No function of the gall-bladder was revealed in an intravenous cholangiogram and by Graham's test. The report on a liver biopsy was as follows: "The appearances suggest obstructive jaundice but the possibility of chlorpromazine jaundice or other form of cholangiolitic hepatitis cannot be excluded."

The patient was discharged from hospital, still jaundiced. She was readmitted early in the following year for laparotomy.

Clinical Discussion.

DR. B. P. BILLINGTON: In summary, then, we have a woman of 53 years of age who presents with jaundice of some months' duration, from May to December at least. Generally speaking, we can consider cases of jaundice as being of two types, those which are easy to diagnose and those which are hard, and this one I feel falls half-way between, at least if I am correct. On going through the history, we have some other things to consider, and I suspect they are not relevant to the diagnosis of this illness. The patient had a blood pressure reading of 210/120, a harsh systolic bruit over the whole precordial area and a faint cloud of albumin in her urine. This to me means hypertensive cardio-vascular disease with nephrosclerosis. One might wonder how to explain the harsh systolic bruit. I am not going to hazard a guess as to whether there was mitral incompetence or aortic stenosis. The latter is unlikely in view of the blood-pressure readings. I do not feel the bruit is relevant to the case, and shall not discuss it any further.

The real problem revolves around the jaundice. What factors have we to talk about? We have an onset clouded in mystery, an onset in which jaundice may have subsequently disappeared and then reappeared. During the time between the possible disappearance and reappearance, the patient had "Largactil", which is well known as a substance capable of producing jaundice, the mechanism of its action being ill understood. Nevertheless, I think we have documentary supposition that jaundice existed before the patient was given "Largactil", as she appeared to have dark urine and pale motions before the drug was taken, and I think we can exclude "Largactil" as the primary cause for jaundice.

The next episode consisted of jaundice, which reappeared, then fluctuated in intensity, but remained constantly present. During this time the motions were pale, but they returned to normal colour. One wonders if there may have been a hepatitis, in the sense of an acute episode of liver-cell damage, caused by either an infective or toxic agent. It is true that she had taken "Butazolidin", but I think this is irrelevant; there was no jaundice contact or previous injections, so one presumes, from historical evidence at least, there is no suggestion of primary hepatitis, and in fact the story is not suggestive of anything else but obstructive jaundice, with pale stools, dark urine and itching. However, there was no abdominal pain, and perhaps this is something we should explain. The persistent pruritus, of course, goes with the obstructive jaundice. There was something else of interest about the skin—namely, linear xanthomas. A slide of her hands shows the deposits to be in the creases of the palms and in the flexures between her palms and proximal phalanges.

If there was obstructive jaundice, and all the clinical evidence suggests it, and if, in addition, these were xanthomas, are we going to explain xanthomas on the basis of obstructive jaundice, or are we going to suggest that the obstructive jaundice was caused by xanthomas? The association was known about 100 years ago to Addison and Gull in a Mrs. Parachute. As you know, in the past there was a disease, xanthomatous biliary cirrhosis, in which it was postulated that the primary disease was a disorder of lipid metabolism in which some of the disseminated xanthomatous deposits were to be found in the biliary passages causing obstructive jaundice. The literature contains descriptions of a few cases in which xanthomas were present with cirrhosis of the liver and jaundice, and the xanthomas appeared to involve the bile ducts, although it is not clear from the reports, whether in fact occlusion of the bile ducts was produced. Most people would now say that such xanthomas are universally secondary to obstructive jaundice rather than the cause, and in this case we may presume that it is so. It is a little unusual, perhaps, that the xanthomas were obvious within seven months of the onset of the jaundice, particularly as any obstruction was far from complete.

Laboratory investigations on the blood provide some features which may help in diagnosis. The serum proteins were 6·4 grammes per 100 ml., of which albumin was 2·8 grammes per 100 ml. and therefore definitely lowered. The bilirubin was quite high—11·3 mg. per 100 ml.—with a positive direct Van den Bergh reaction, the thymol turbidity was normal, the zinc sulphate turbidity was questionably elevated, the alkaline phosphatase level was grossly increased. There are figures which show that the levels of cholesterol (950 mg. per 100 ml.) and of total lipids (1850 mg. per 100 ml.) were greatly increased, and I think this bears a little discussion, particularly in relation to the fact that the thymol turbidity level was 2 units. With total lipids of 1850 mg. per 100 ml., one might think in terms of some form of lipæmia such as occurs in diabetes with ketosis, the nephrotic syndrome, pancreatitis and essential hyperlipæmia. All of these conditions show a large total blood lipid content, but the serum is opaque or cloudy or milky to look at. There is no comment here as to whether the serum was cloudy or clear. We have to note also that the thymol turbidity level was only two units. If the serum was cloudy, we would presume that a large proportion of the total lipids was made up by neutral fats, and under that circumstance we would expect that the thymol turbidity would be elevated for, in fact, we think that this test registers to some extent the level of neutral fats circulating in the blood. Later we shall ask Dr. Neale to make some comments

on these biochemical findings in assessing the diagnosis of this case. What other possibility is there, if in fact she did have a clear serum, which would account for the thymol turbidity of 2 units and explain the cholesterol of 950 mg. per 100 ml. and the total lipids of 1850 mg. per 100 ml. In obstructive jaundice we frequently find a high cholesterol and high serum lipids; but under these conditions there is also a high level of phospholipids in the plasma, and this, in some obscure way which I do not understand, allows the serum to have a clear appearance, apparently because there is little neutral fat circulating, and the phospholipid and cholesterol make up most of the total fat. It does not appear to matter what causes the obstructive jaundice. Nevertheless, this seems like a very high figure to obtain after several months.

Summarizing, we have a woman of 53 years of age with obstructive jaundice, xanthomas, high serum lipids and a clear serum. We have two conditions to think about: Firstly, is this primary biliary cirrhosis, a disease of unknown cause which has the features which we have mentioned? Or is this biliary obstruction due perhaps—to some surgical lesion? The final changes in the liver may be identical in both conditions. In other words, we have to decide whether there is primary or secondary biliary cirrhosis. We know the liver is enlarged, and we know that the spleen is not palpable. Does this help us? No, the liver is enlarged in both conditions and the spleen is usually not enlarged early in obstructive jaundice, although it certainly may become enlarged later in both conditions, especially when cirrhosis is well established. We have, then, to make a distinction between early primary biliary cirrhosis and jaundice due to an organic obstruction of the bile ducts. The positive diagnosis of primary biliary cirrhosis depends on the objective demonstration of the patency of all major biliary channels, intrahepatic and extrahepatic, and this can only be satisfactorily executed by operative cholangiography.

We have information on the clinical side; the story of rigors surely points to an organic obstruction of the main bile passages, representing Charcot's intermittent fever, although there is no record that fever was documented by the thermometer. Charcot's intermittent fever was described in 1877, consists of the classical phenomena of pain, jaundice and fever, and is usually associated with some organic blockage of the bile passages or with disease of the bile passages causing cholangitis and hepatitis. There is a white cell count of 18,000, which would suggest that there was an inflammatory process affecting the bile ducts and the liver. As patients with primary biliary cirrhosis do not have rigors or leucocytosis, the evidence points to organic disease affecting the main bile passages. The sedimentation rate of 97 mm. in one hour would also fit. The prothrombin index of 77% may indicate that the liver cells were a little "sick", and this would be supported by the lowered serum albumin level, or that insufficient vitamin K had been absorbed over a period of time as a result of the obstructive jaundice. The type of response to parenteral administration of vitamin K might solve this issue. If we say on the clinical evidence that it seems likely that our patient had organic obstruction of her bile passages rather than a primary biliary cirrhosis, are there ways which might help confirm this diagnosis? Liver biopsy does not help as a rule in the differential diagnosis between primary and secondary biliary cirrhosis, but can establish whether cirrhosis is present or not.

This is a liver biopsy report which I hope Dr. Palmer will show later. The appearance is suggestive of obstructive jaundice; but the possibility of chlorpromazine or some other form of cholangiolitic hepatitis cannot be excluded. As we have mentioned, "Largactil" amongst other drugs can produce changes in the liver which now go under the name of cholestasis. Cases have been recorded in which the effect has persisted two years after the withdrawal of the drug, in which biochemical alterations especially in the lipids have been present, with the formation of xanthomas. We have already stated that, historically, "Largactil" will not fit this case. Any form of hepatitis—but especially viral hepatitis—may produce cholestasis as the dominating clinical and biochemical picture. We can be certain, therefore, that this patient did not have cirrhosis, but did have cholestasis; but the liver biopsy alone cannot be expected to reveal the cause of cholestasis in every case. I hope Dr. Palmer may be able to give us some clue as to how we may differentiate on biopsy between intrahepatic cholestasis produced by drugs and infections on one hand, and cholestasis produced by major duct obstruction on the other.

Clinically, this woman of 53 years of age had obstructive jaundice, which we think is of surgical rather than of medical type.

What sort of lesions can cause obstructive jaundice? The usual things to consider are lesions of the gall-bladder and of major bile ducts, either intrahepatic or extrahepatic. You notice that this jaundice was intermittent and that it was painless. Characteristically, gall-stones cause intermittent jaundice, but they should produce pain; however, at least 10% of them do not, and this case may well fit in with a gall-stone obstructing the duct causing intermittent jaundice, Charcot's fever, and producing xanthomas and the biochemical changes of obstructive jaundice rather rapidly. If the liver was normal when all this started in May, I should be a little dismayed. I suspect that there had been michief in the bile passages for some time to account for the xanthomas and the high serum lipids seven months after the commencement of her symptoms, and certainly this theory could fit in with stone in the common duct. However, we have no history of biliary colic, and one just puts a question mark against this.

What other possibilities are there? What about carcinoma of the head of the pancreas? The jaundice at first was intermittent, and this is unlike carcinoma of the head of the pancreas, where jaundice, once it occurs, usually remains constant. Carcinoma of the ampulla or papilla of Vater, on the other hand, characteristically in the early stages gives a fluctuating story. There may be little pain, and differential diagnosis between stone and carcinoma of the ampullary region is not always easy at the clinical level, and this diagnosis must be considered here. There are two points against carcinoma, however; firstly, there was no occult blood in the stools, which may be expected in a neoplastic lesion in this area; and secondly, classically, carcinoma of the papilla of Vater should produce fluctuant jaundice of low degree in its early stages, and this was palpably not jaundice of low degree. So I think carcinoma of the papilla of Vater is unlikely. What other possible obstructive lesions are there? Stricture of the bile ducts? The patient had no previous surgical operation, which probably is the commonest cause of stricture; but we may have stricture without operation following stone, but usually in these cases there is some form of ulceration or trauma to the bile ducts which should have been documented historically, and which is not so in this case. There is, of course, a further type of stricture, in which a stenosing cholangitis of unknown ætiology occurs. It is not clear to me how one diagnoses this condition as a primary lesion prior to laparotomy, and I imagined that one might have a more gradual onset of obstructive jaundice; but certainly in the case we saw here last year the history was one of Charcot's intermittent fever for some time, and so a diagnosis of cholangitis might fit this case. Neoplasm of the bile ducts and carcinoma of the gall-bladder are certainly in the picture; but once again we have to consider that our patient had a fluctuating course, and this certainly did not fit neoplastic obstruction. What about lesions outside the common bile duct, such as glands, aneurysm of the hepatic artery and so on? Glands in the porta hepatis are an uncommon cause of obstructive jaundice. More frequently glands along the lesser omentum cause obstruction to the major ducts, and once again we would expect the obstruction to be progressive. This is equally true for the other possibility of intrahepatic bile duct obstruction due to deposits of abnormal tissue, and there is no evidence of any other primary disease. Aneurysm of the hepatic artery may produce jaundice which may be intermittent. Carcinoma of one hepatic duct may produce obstructive jaundice and biliary cirrhosis restricted to one lobe of the liver. How the jaundice is produced I would not like to say; but in such a case the lipid changes of obstructive jaundice do not occur, and so there is no need to invoke such a diagnosis here. Hydatid disease of the liver may produce a story of obstructive jaundice, perhaps with episodes of hydatid fluid leaking into the biliary passages with pain, fever and rigors. In this case the Casoni test was negative, and although this does not necessarily exclude the diagnosis, this case does not strike me as being due to hydatid disease. Other possibilities such as duodenal diverticulum or duodenal ulcer producing obstruction of the bile ducts and the various worms which can inhabit the biliary passages, could be invoked; but I don't think I should mention them further, as there is no positive information to suggest their presence, although we have no barium-meal examination to exclude the presence of a duodenal diverticulum. There is a condition of so-called pericholangitis, which clinically produces an obstructive jaundice, in patients who have ulcerative bowel disease. The pathogenesis is a little obscure, but the clinical counterpart is usually fairly obvious, and our patient has no evidence of ulcerative colitis. We are left, then, with stone, stenosing cholangitis and stricture, as the possible causes of this woman's obstructive jaundice.

Now, are there any things which make this case a little peculiar? Yes, I think these are. Firstly, the absence of pain; secondly, the rather large number of alterations of liver functions, particularly the rise in the total serum lipids in a relatively short time with the development of xanthomas; and finally there is another odd point in the electrophoretic pattern. You recall that 27% gamma globulin was associated with a zinc sulphate turbidity of 9 units. Do we explain the changes in the gamma globulin by the fact that there had been cholangitis for some time, and that these changes have been produced as the result of the hepatic reaction to this infective process? I do not know about that. Another explanation could be that the raised gamma globulin level, the natural reaction to the hepatic cell injury, produced in this case by bile-duct obstruction, was not commensurately expressed in the zinc sulphate turbidity test on account of the relatively high and persistent levels of the serum bilirubin.

If one makes a diagnosis of calculous disease, where is the stone? Is it in the common bile duct? Or are there more than one, and are they in the gall-bladder? This is where I would like Dr. Greenwell's help, inviting him to cross swords with me if he will. I would like to ask him whether obstructive jaundice of this type, intermittent, and then continuous, with Charcot's fever and so on, means that the stone must be in the common duct, or whether in fact this illness can be explained by recurrent cholangitis arising from an infection in the gall-bladder without there necessarily being a stone in the common bile or hepatic duct. I do not think I can go any further than this, except to suggest as my diagnosis painless stone in the common bile duct, and to say that stenosing cholangitis and stricture of the common bile duct are secondary possibilities.

DR. H. M. WHYTE: Do not let this very short list of possible diagnoses inhibit anybody. In fact, I think we should add to it the ubiquitous *"et al."*. I am sure you do not believe everything that has been said. Do you really believe that there were stones here? And do you believe that Dr. Billington, who saw this case, I would remind you, during life, thought that there was a stone there and then let her go out of hospital to return next year before allowing the surgeons to do a laparotomy? And what about the "Largactil"? I'm sure you have all got views on these questions. There are various contentious points that Dr. Billington has raised; for example, did she have primary xanthomatosis, or was this secondary? This rather rapid accumulation of cholesterol in the palms of her hands, could it all date from the time of her first obstruction? And there are questions about the liver function tests and the histology of cholangiolytic jaundice in biopsy specimens.

DR. W. CALOV: Dr. Billington did not explain why there was apparently no function in the gall-bladder—the X-ray procedure did not reveal any gall-bladder shadow.

DR. BILLINGTON: I am sorry that I did not mention that; I think the patient was so jaundiced that the liver did not secrete sufficient dye, and therefore the test cannot be used to detect gall-bladder function. I assume in hæmolytic disease (which I have not mentioned, as there is no cause), where the serum bilirubin may rise to say 4 mg. per 100 ml., we can get a normal cholecystogram. But I have not seen such a case put to the test. However, I would presume in this case that the degree of jaundice, be it obstructive, hepatitis or what you will, precludes the liver excreting dye for a normal gall-bladder to produce a shadow.

DR. A. SHARP: Can Dr. Billington inform me why she was given "Largactil"? Does the history mean she was given "Largactil" and took 36 tablets until she became jaundiced?

DR. BILLINGTON: I understood this to mean that she was not feeling very well, and she consulted her doctor, who gave her "Largactil", and that she had 36 tablets in 26 days, and then jaundice was apparent and the "Largactil" was withdrawn.

DR. M. MISHKEL: Could I elucidate on that point? Actually the story was very complicated. The patient is very intelligent. There were so many personalities. I rang her own doctor and rang the chemist, and I spoke to several of the members of the family. The "Largactil" was given because the woman complained of anorexia, nausea and a little vomiting, and it was (subsequently) assumed that she was suffering from "Largactil" jaundice; but it was seven months before she came into hospital for investigation, because the outside doctor presumed that all along she had "Largactil" jaundice. But on going back through the history, and I have drawn an actual graph of the story, it was quite obvious she had indeed had symptoms related to the jaundice before she ever took the "Largactil" and on closely questioning several of the members of the family, quite a number of people did admit that the jaundice dated from May 1, 1957, whereas she started to take "Largactil" about May 18. So that I agree with Dr. Billington that "Largactil" had nothing to do with jaundice. But I must admit that the outside practitioner did think for from four to seven months that she was suffering from "Largactil" jaundice.

DR. WHYTE: Would you like to come into the witness box, Dr. Greenwell?

DR. P. H. GREENWELL: I was formally asked to talk this afternoon, but I do not wish to reiterate what Dr. Billington has said. However, I would like to make some comments. As it would appear that Dr. Billington and I have similar views about this case, I feel that to put the position clearly I must say I did not see the operation, and I was not informed of this case previously.

The circumstances here suggested to me an obstructive jaundice. I would go further in saying that the history is one of nine months' duration; it goes back to March, at which time this patient gives a substantial history of attacks of what I take to be Charcot's biliary fever. I think this represents the actual crux of the problem, a varying jaundice, which suggests some lower biliary obstruction. This was the first decision I came to. So I would say in the first place that this is a case of chronic obstructive jaundice with infective episodes. Then, in consideration of the second last paragraph with all these specific investigatory data, there did seem to me to be some features that were not consistent. There was, for instance, a low albumin figure. I also felt that the zinc sulphate result was high, and although consistent with the raised gamma globulin, was not altogether consistent with a pure obstructive type jaundice. However, my explanation for this was that, with a progressive and what I believe to be a fairly long-continued obstructive jaundice associated with infection, these changes indicated an overlying hepatogenous factor. Having come to the conclusion that this was a chronic obstructive jaundice, I only had to decide whether this was intrahepatic or extrahepatic in site. I felt as a surgeon I should take the view that this was an obstructive jaundice of surgical origin and advise operation. That would have been my course if I had been consulted in this matter.

I thought I should talk about the types of obstruction that might reasonably be found. If one looks at it logically or according to a "surgical sifter", one thinks first in terms of congenital lesions. Dr. Billington did not mention that there was a previous history of jaundice in childhood. However, I think this past history has no relation to the problem at all, and I cannot see that an intermittent jaundice of this nature could be caused by any congenital factor.

The second cause in a surgeon's mind when he is thinking in these terms is trauma, and there is no evidence of trauma here, as Dr. Billington has already pointed out. Blunt abdominal injury can cause stricture of the common bile duct during the healing process; but there is no history of it, nor is there any suspicion of it. Furthermore, Dr. Billington has said there has been no operative interference, so the surgeon obviously was not responsible for a possible stricture. As regards infection, there is no question that there is secondary infection in this case—an infective overlay which I would regard as an ascending cholangitis of chronic form with acute episodes. In this respect we have to consider Dr. Billington's second diagnosis of stenosing cholangitis. Probably what made me think in terms of this entity in this context was just such a case dealt with in this hospital about four years ago—a case of stenosing cholangitis presenting in a similar way—and for this reason I think this is a very likely diagnosis here. Dr. Billington has correctly said that in our experience duodenal papillary neoplasms do cause intermittency in their initial phases; but there are lots of factors against this diagnosis, and I would do as he has done, exclude the papillary carcinomas in this determination. Other neoplasms which require consideration are the primary and secondary growths that can occur anywhere in relation to the extrahepatic mechanism. One would have to consider here, too, secondary lesions of liver or even a primary hepatoma occurring in the substance of the liver itself, and causing what is virtually obstruction of the major ducts and therefore really an extrahepatic obstruction. All these I think can be excluded by saying this was an intermittent jaundice, and these conditions just considered bring about a progressive jaundice. I do not think we could bring in any of the cysts, not even the rare choledochal cyst, into this picture.

I feel this obstruction occurred as an intramural obstruction. Stone is unquestionably the commonest cause of

obstructive jaundice and I feel we should not go past this in making our diagnosis. I would choose, as Dr. Billington has, stone as being the cause of this obstruction with the secondary effects that he has mentioned. My second diagnosis would be stenosing cholangitis. Chlorpromazine does not, as far as I am concerned, enter into the picture, because I believe symptoms were present before its administration. And therefore, from a surgeon's point of view, I would suggest operation in this case. I would explore, and I would expect to find a stone. If I found a clear intrahepatic and extrahepatic biliary tree, then I would pass the case back to Dr. Billington.

DR. WHYTE: Dr. Neale, would you like to comment on the liver function tests?

DR. F. NEALE: I feel that the previous speakers, Dr. Greenwell and Dr. Billington, are probably correct, and the stone theory is the likeliest explanation. The thing that does surprise one about the history is the tardiness in the admission to hospital; but if we can accept as reasonable that the patient be severely jaundiced for seven to nine months before admission, perhaps we can explain why the patient was subsequently discharged before readmission for laparotomy. With regard to liver function tests, the serum proteins are inverted and there is a high alkaline phosphatase, but we have unfortunately only one series of tests and do not have sufficient information on the sequence of events to know which way these were progressing. At the time these were performed, there was a high total lipid with a very high cholesterol contributing towards this total, and Sheila Sherlock's book records her observation that obstruction of over three months' duration is enough to produce xanthomata. Now this is not a condition which I can recall having seen before, perhaps because our obstructions were dealt with before three months had elapsed, although I have seen several cases of idiopathic hypercholesterolæmia with xanthomata. This would appear to be a complete obstruction, although there are some rather anomalous findings—namely, no urobilinogen was found in the urine and at the same time the stools were a normal colour. This is difficult to understand. The serum bilirubin level was high, and it is not easy to see why, if it was escaping into the intestine, some of it should not come back as urobilinogen. The serum bilirubin level is fairly consistently moderately high; but in complete obstruction one finds values of 20 to 30, even 40 mg. per 100 ml., so there is probably some intermittent leakage although the phosphatase is staying high. This will usually remain at an elevated level after the bilirubin and cholesterol have cleared themselves somewhat. The patient had 12 grammes per 100 ml. hæmoglobin and had a macrocytosis with a 77% prothrombin level. I think this also indicates a generally somewhat unhappy state of metabolism in the liver. The sedimentation rate of 77 is probably associated with the moderate increase in the alpha-2 globulin—all of which could occur with a prolonged infective process. Visual examination of the strip I find to be quite helpful without this detailed analysis, because it is not always easy to visualize from a list of figures the appearance of the strip when it was originally prepared. Regarding the lipæmia or otherwise of the serum, a differential fat stain of the strip would have been quite useful here. Chylomicrons, free fatty particles, will stick on the origin of the strip and on staining for fat they are seen there. The alpha and beta lipoproteins will migrate approximately with the appropriate protein fractions. In summary, I think that this case does look like an intermittent, otherwise complete, obstruction with superimposed infection, and the obstruction is most probably caused by a gall-stone.

DR. L. C. A. WATSON: Levels of serum alkaline phosphatase as high as 130 King-Armstrong units are rather uncommon. I have seen levels of this order in Paget's disease, carcinoma of the biliary duct system, and in the pericholangitis associated with ulcerative colitis. Dr. Billington has told us that there is no suggestion of ulcerative colitis, and widespread Paget's disease seems most unlikely, so that I would suggest carcinoma of the biliary duct system as the most likely diagnosis.

DR. WHYTE: By that you mean obstruction?

DR. WATSON: Oh yes, an obstructing carcinoma.

DR. WHYTE: The phosphatase is due to obstruction and not to carcinoma?

DR. WATSON: Well, I do not know. This is a moot point, but it is possible that the extremely high levels of biliary carcinoma are also due to factors other than obstruction. I would emphasize that serum alkaline phosphatase levels of this magnitude have been unusual in my experience.

DR. WHYTE: I think we had better proceed to Dr. Palmer now, and then later, having closed the meeting, we can continue discussing the case.

Pathological Findings and Discussion.

DR. A. A. PALMER: Dr. Billington has asked me to say something about obstructive jaundice; I shall be very brief. This is a section of the liver of a patient with advanced obstructive jaundice, and in the middle there is what we call a bile lake with surrounding degenerating cells and histiocytes. Now when you see this, it is generally accepted that you can be pretty certain you have got extrahepatic biliary obstruction, or at least obstruction to a major duct. Another pointer is to find polymorph leucocytes inside ducts —an indication of cholangitis. Neither of these two things was found in this biopsy, and unfortunately bile lakes are rather rare in liver biopsies, so very often we cannot tell for certain whether we are dealing with extrahepatic or major bile-duct obstruction, or some disease which causes retention of bile often for rather obscure reasons, such as in so-called cholangiolitic hepatitis. To return to this patient, I will just give you the results of the operation. Very soon after the second admission, laparotomy was performed. It was found that the duodenum was adherent to the under surface of the liver, and that the gall-bladder was hard to find; it was small and fibrosed. The common duct was palpated, and a stone was felt within it. A needle was inserted into the common duct, and bile was aspirated. The duct was incised and a stone was removed. A stone was also removed from the gall-bladder. The incision was closed. A tube was inserted within the common bile duct. Following operation, as far as I can make out, recovery was somewhat slow, but jaundice disappeared and has been absent ever since. The bilirubin fell to 0·6 mg. per 100 ml. and later to less than 0·5 mg. per 100 ml. The alkaline phosphatase subsided somewhat less rapidly, eventually reaching a level of 23, beyond which value it fell no further. Cholesterol fell eventually to 280 mg. per 100 ml. from the original 950, and the last time serum lipids were estimated there had been a considerable fall. I do not know whether there are any other questions you would like to ask.

So the diagnosis, then, was stone in the common bile duct, also chronic cholecystitis with stone in the gall-bladder and presumably cholangitis.

DR. WHYTE: Are there any questions you would like to ask of Dr. Palmer?

DR. MISHKEL: Mr. Chairman, I should like to add a late, final comment. The patient subsequently presented with a spontaneous fractured rib and ascites, and it was considered indeed that something must have been missed at operation. I was present at the time, and it was a very difficult operation, and it was thought that maybe a carcinoma of the head of the pancreas had been missed. I can tell you that 10 days ago (the woman comes to see me every couple of months) she was hale and hearty, and I presume that the fractured rib was indeed due to the fact that she had considerable osteoporosis from chronic jaundice. Now it was rather interesting that when I shake hands with this woman, as I always do, in order to feel these xanthomata, I could feel nothing, so I then turned the hands over and had a look at them, and indeed she had no xanthomata. But I made the great mistake of looking at her face, and there on her upper eyelids, where she had never had them before, she had xanthelasma palpebri. I do not understand why these should have developed.

Diagnosis.

Chronic cholecystitis with gall-stones, stone in the common bile duct and cholangitis.

Out of the Past.

TREATMENT OF THE INSANE.

[From "Victorian Treatment of the Insane", by Dr. W. Balls-Headley, *Victorian Review*, May, 1880.]

IT thus appears, that scarcely ever in the history of the colony have the lunatic asylums afforded sufficient accommodation for the insane, and it must be that their medical treatment is thereby affected and contracted. On this point the late Dr. Robertson remarked—"The importance of the early treatment of insanity is rendered apparent from the foregoing table where it appears that out of the total of

284 recoveries, no less than 224 took place within one year after admission."

From the above quotation, as well as from the copious reports on every subject connected with the hospitals for the insane, annually issued by the Inspector of Asylums, and those by special commissions of inquiry which have been at no long intervals appointed, it is evident that the whole state of the asylums has always been, and still is, thoroughly recognised by the local management, and made known to the Chief Secretary; that it has been the custom for the Chief Secretary to systematically ignore these reports, and to neglect the insane up to the limit that public opinion would permit. Yet it appears that never did more valuable inspectors' and commissioners' reports issue than in 1876, containing, as they did, recommendations on all points that are still found to be wanting; and never were reports tossed more contemptuously into the waste-paper basket. It is evident that Chief Secretaries have either not the time, inclination, or power to fulfil the duties of chief of the insane department; and the question, therefore, arises as to an alteration in this respect, wherein the system of management palpably breaks down.

Nor is this point of weakness peculiar to Victoria. In Tasmania, where the number of the insane is tolerably stationary, the asylum at New Norfolk appears to be admirably worked by ten commissioners and the superintendent, Dr. Huston, who annually report to the Governor-in-Council; yet it is evident that it is a difficult matter to induce the Government to make such improvements as by the former are thought essential.

In New South Wales, where there is an annual average increase of 77 lunatics, there have been made, under the excellent management of the inspector, Dr. F. Norton Manning, many and great improvements, and a magnificent institution, on the newest and most approved principles, has been planned; yet, by the report, it appears that long afterwards no steps had been taken for its erection, which is regarded as of the most serious importance; thus overcrowding overcrowded buildings was occurring; the excess being 263 patients.

In South Australia, where the annual average increase is about 26, the Colonial Surgeon, Dr. Alex S. Patterson, reports that "the subject of further accommodation is one of pressing importance". The arrangements there, however, seem to be admirably conducted.

There thus is shown to be an absence on the part of governments of appreciation of the necessity of a lunacy policy; and of a practical acknowledgement of the fact, that at the end of the year there will certainly be such an increase in the numbers. In the words of one of the most versed in the subject, "In my experience, nothing is more difficult than to make colonial Ministers think of the insane. It seems to them a grievance that such folks should exist, and they treat the subject with a bare tolerance, or with ill concealed disgust".

Obituary.

MALCOLM WELD FLETCHER.

We are indebted to Dr. G. M. W. Clemons for the following account of the career of the late Dr. M. W. Fletcher.

Malcolm Fletcher died suddenly on May 13, 1960. He was born in Adelaide in 1910, and his death in his fifty-first year was indeed a great loss to a very wide circle of friends and patients in all walks of life. Educated at Scotch College, Adelaide, he graduated M.B., B.S. (Adelaide) in 1933. He was a resident medical officer at the Adelaide Hospital in 1934, out-patient registrar in 1935 and resident medical officer at the Adelaide Children's Hospital in 1935. Work in general practice followed, and he then proceeded to London, where he was admitted to membership of the Royal College of Physicians in 1940. He served in the Royal Naval Volunteer Reserve with the rank of temporary acting surgeon lieutenant-commander from July, 1940, to May, 1946.

After the war, he came to Tasmania as Assistant Medical Superintendent to the Launceston General Hospital, holding the appointment until 1949. At this time, the ranks of the physicians were thin, the staff was not well balanced—the surgical side predominating—and it can fairly be said that he did much to raise the standard of medicine in the hospital.

In 1949 he went into private practice and was appointed Honorary Physician to In-Patients. It was not long before his reputation as a physician was established, and he became most highly regarded. Of the many qualities, apart from his academic ability, which achieved this reputation, perhaps the most outstanding were his great kindness, his capacity for friendship and his tenacity. The two former were shown in innumerable ways in his private life and to his patients—to the latter, for example, by his habit of dropping in to see them at odd and essentially unnecessary times and always with a cheerful and comforting word. His tenacity was well exemplified in his care of the patient who was desperately ill; even with apparently hopeless cases he would persist, and I have seen this tenacity rewarded. But, when he was not successful, the help and comfort which he gave in these circumstances cannot be over-estimated. This quality is surely an essential attribute of the physician and one which he possessed in a marked degree.

Despite a busy and exacting professional life, especially so as his patients' troubles weighed heavily on him, he gave most generously of his time in many British Medical Association activities. He was chairman of the Northern Division of the Tasmanian Branch in 1954, president of the Tasmanian Branch in 1957, and a member of the Branch Council for some years. In none of these activities did he spare himself; nothing he undertook was shirked.

He was a most active and valuable member of the Medical Staff Committee of the hospital, and at the time of his death, vice-chairman. At times he had difficulty in expressing his views fluently; but he was nevertheless forthright in debate and patently honest and sincere. He could not abide subterfuge; he was always prepared to state his opinion openly and urged others to do likewise. I believe his efforts in this direction were of great value to the Committee, and I hope will be remembered. His death, when his fullest and most fruitful years were just ahead, is indeed a very great loss,.

No account of Malcolm would be complete without mention of his wife, Janet. They were fortunate in each other, and to her and their family, a son and three daughters, goes our deepest sympathy.

DR. C. CRAIG writes: When Malcolm Fletcher first joined the staff of the General Hospital, Launceston, soon after the last war, the writer was Surgeon Superintendent. The honorary staff was not as large then as it is now, and it was found necessary to appoint two men, one a physician

and the other a surgeon, to the full-time staff. The surgeon was Mr. T. G. H. Hogg, who is still on the permanent staff, and the physician was Malcolm Fletcher. Within a few years the position of Surgeon Superintendent was divided into two, Dr. John Edis becoming the General Superintendent, and the writer continuing as a surgeon. The little circle of full-time staff thus created was one of the happiest it is possible to imagine, each one took the greatest possible pleasure in working with the other, and the years passed in complete harmony. The circle was first broken when Malcolm Fletcher left to enter private practice. Dr. John Edis was then appointed Director-General, and the writer gave up surgery to become a radiologist.

In later years another pleasant circle was formed. This was for the purpose of Sunday afternoon golf. There were usually four, but sometimes five or even six players. The afternoon finished with tea and drinks at Malcolm's home. Malcolm and his wife, Jan, delighted in hospitality. Malcolm will be remembered by us all as one who had a genius for friendship. With him has gone very much that was pleasurable in life.

DR. W. P. HOLMAN writes: Malcolm Fletcher moved to Launceston after a characteristic quick look followed by a quick decision. He came mainly because he liked the group of people he met at this first visit. He was then a well-qualified physician, and it was soon clear that he would reach the highest standard in any community whatever its size.

Within a few years his practice grew so much that he sometimes worried whether he allowed himself sufficient time to study and to think. This concern was unnecessary from a professional point of view; but physically he asked too much of himself. This attitude was in keeping with the whole pattern of his life. He was a practising idealist—his convictions were ardently held and shaped all his behaviour in war and peace.

It was natural and usual for him to be affectionate and tolerant. However, when he saw contempt for the individual or limitation of personal freedom, his reaction was sudden and effective.

To join him at home with his family was warming to anyone. His medical friends were aware of what an inspiration he would have been as an undergraduate teacher.

He lived in a community not too big to appreciate the unique effect of his work. At the service at his church, St. John's, and in the streets, his family saw a demonstration of public feeling which none of us will forget.

DR. W. W. WOODWARD writes: The courage that took Malcolm Fletcher to the North Sea in a destroyer was often to be seen in Launceston—for instance, in 1957, when a cardiac episode, probable forerunner to this last fatal one, forced him to rest for a few weeks. His standing among us did not depend on his post-graduate diplomas, for he led also as a man. An alleged injustice he would never allow to pass unexamined, no matter how elevated the authority to be opposed. He strenuously fought regulations likely to interfere with reasonable individual freedom. Nevertheless, if charges against authority began to outrun accuracy, he was the first to bring restraint. He called his colleagues by surname until he knew them well, and refreshingly saw no need to prefix this with "Doctor".

At the General Hospital, Launceston, for no material reward he cared for his public patients with every ounce of his energy and abundant kindness. He preserved these fellow beings from any unnecessary investigation. Hence, though he was present at countless clinical meetings, no patient of his ever became the subject of merely academic study; none would ever become clinical material. Along with the healing drive of the therapist he had the honesty of the scientist; a characteristic Fletcher statement was: "I don't know what he's got." This did not mean that he would stop trying to find out, for his clinical tenacity was that of a bulldog; indeed, an occasional patient with an incurable label got from him a new diagnosis and cure.

At his happy home the hospitality given by himself and his wife, like all their kindnesses, was unostentatious. One of their three daughters is a nurse at the General Hospital, and their son recently matriculated with an extremely good result. Their loss and that of his patients and colleagues has come decades too soon. At the funeral service St. John's Church was so full that some stood. I did not know till then that the church knew him well. "He who would valiant be" was sung. Later, a friend of his said "He was a brave man"; and a New Australian said: "He was a kind man, Dr. Fletcher. God would have got up specially to go and open the door for him personally." He was one of the greatest doctors, in the fullest sense of the word, that I have ever met or heard of.

Correspondence.

THE DILUTION ANÆMIA OF PREGNANCY.

SIR: I read with interest the article by Dr. Whiteside on "The Dilution Anæmia of Pregnancy" in the Journal of August 20, 1960. I should like to make these comments.

The dilution effect observed in late pregnancy is maximal about eight weeks before delivery, and there is some variation in the extent of the increase observed in the period 28 to 33 weeks, depending on the date of delivery (Cope, 1958).[1]

The correlations of plasma and blood volume with weight, surface area and lean body mass are not great and Tanner (1949)[2] has shown that these standards are theoretically fallacious and often misleading. The presence of the developing fœtus makes these standards even more fallacious. It is therefore better to record the plasma volume estimations as absolute values to allow valid comparisons to be made.

The apparent failure of the red-cell mass to show an increase in late pregnancy is due to the method of calculation and correlation. It is almost certain that the standard of 0·91 for the total/peripheral hæmatocrit cannot be applied correctly to blood volume estimations in mid and late pregnancy. Caton *et alii* (1951)[3] have shown that this ratio varies considerably in late pregnancy, and they and Berlin *et alii* (1953)[4] have shown, by direct estimations, that there is an increase in the total red-cell mass. This, however, is not as great as the increase in the plasma volume.

The physiological hæmodilution is undoubtedly due to the development of the arterio-venous shunt at the placental site (Burwell, 1938).[5] The many changes in the circulation in mid-pregnancy closely parallel the changes in the circulation with a large congenital or traumatic arterio-venous fistula (Holman, 1940).[6]

There is, in late pregnancy, some closure of this fistula, resulting in a partial reversal of these changes. At this time, there is an improvement in the peripheral hæmoglobin and packed-cell volume unrelated to iron therapy. I believe that these changes in late pregnancy are caused by a partial closure of the placental shunt due to increased fibrin deposition in the intervillous space.

233 Macquarie Street,
Sydney.
August 22, 1960.

Yours, etc.,
IAN COPE.

THE CONTROL OF TUBERCULOSIS IN AUSTRALIA.

SIR: I should like to comment on your annotation dealing with the control of tuberculosis in Australia (MED. J. AUST., 1960, 2: 225). In that annotation you were most careful to warn against the over-optimistic view that tuberculosis is "all over bar the shouting"; even then, however, the impression given was possibly too rosy, in that you failed to mention the grave new problem presented by tuberculosis due to atypical (anonymous) mycobacteria, a problem in some ways not unlike that presented by the hospital staphylococcus. This condition of atypical tuberculosis is one in which the picture is indistinguishable from true phthisis clinically, radiologically and in gross and microscopic anatomical changes, but which is caused by one or other of a group of mycobacteria differing in several important respects from *Mycobacterium tuberculosis*—e.g., growth can occur from 22° to 42° C. These "anonymous mycobacteria" have been provisionally classed into four groups, of which Groups I and III are known to affect man in any number.

Until three years ago the condition of atypical tuberculosis was practically unknown, appearing only in rare instances and in widely separated areas; but during the last three years the condition has steadily become more and more widely recognized and more and more common. As regards Australia, only Group III anonymous mycobacteria have been found in man, and have been found only in Queensland and Western Australia. It is of great interest to note that the experiences of Queensland and Western

[1] *J. Obstet. Gynæc. Brit. Emp.*, 1958, 65: 877.
[2] *J. Appl. Physiol.*, 1949, 2: 1.
[3] *Amer. J. Obstet. Gynec.*, 1951, 61: 1207.
[4] *Surg. Gynec. Obstet.*, 1953, 97: 173.
[5] *Amer. J. med. Sci.*, 1938, 195: 1.
[6] *Ann. Surg.*, 1940, 112: 840.

Australia are similar and closely resemble the findings of Florida, Georgia and Alabama.

There are three reasons for regarding this as a serious new threat: not only is it becoming common (now representing not less than 5% of our "phthisis" cases); it is resistant to the chemotherapeutica so effective against true phthisis; and the reservoir of infection is not known. Infection presumably does not spread from man to man.

The problem of the source of the new disease is being closely studied in this and many other laboratories; the only lead to date has been that the Group III mycobacteria somewhat resemble atypical attenuated avian tubercle bacilli. Using this as a starting point, our first finding was that avian tuberculosis is reported as not being known in Western Australia.[1] However, due to the kindness of the Chief Veterinary Officer, Western Australia, we found one solitary report, buried in official files, of the finding in 1954 of the avian organism in four pig glands in this State. Accordingly we investigated the mesenteric and submaxillary lymph glands from local pigs and have to report the astonishing finding that no less than one-third of glands from 117 pigs were found to harbour Group III "anonymous mycobacteria" completely indistinguishable from the mycobacterium causing the new disease in man in this State. This is the first finding anywhere in the world of Group III atypical mycobacteria in animals in close contact with man.

It is presumed that man and pig are becoming infected from the same definitive host, and efforts continue to trace this host (? wild birds).

Yours, etc.,
N. KOVACS.

Public Health Laboratory Service,
Perth,
Western Australia.
August 15, 1960.

DIHYDROMORPHINONE AND THE BRITISH PHARMACOPŒIA.

SIR: Dihydromorphinone tablets for oral use have adorned the absolutely free list in Australia since its inception. Why? Dihydromorphinone last appeared in the British Pharmacopœial Index of 1949 and was scrapped in the next edition.

Incidentally, for us the British Pharmacopœia has no legal validity in New South Wales. Neither the B.P. nor the B.P.C. are mentioned in the *Medical Act*, the *Pharmacy Act* nor in the Regulations promulgated under those Acts. Grocers, it is true, have to toe the line of the B.P. and the B.P.C. (*Pure Foods Act*, Regulation 70), but we professional men and our colleagues the pharmacists are not bound by those most ably devised official standards. We are bound by shibboleths. This letter is written "for a specified purpose", i.e., to expose the anomaly.

607 New South Head Road,
Rose Bay,
New South Wales,
August 10, 1960.

Yours, etc.,
GODFREY HARRIS.

TOTAL BLINDNESS FROM TEMPORAL ARTERITIS.

SIR: Mr. Kelvin Lidgett's observations (MED. J. AUST., August 6, 1960) upon Mr. Hugh Ryan's report of a case of total blindness from temporal arteritis are timely. One wonders whence Mr. Ryan got the impression that the disease "has tended to be regarded as a bizarre and often irritating condition, but without severe complications". Surely it is well known that everything turns on whether the patient is destined to lose the sight of one or both eyes once it reaches its climax, the stage of swollen vessels. Thereafter the issue is soon decided. Of four cases seen by me, two became totally blind, one blind in one eye, and one escaped permanent visual damage. Results in larger series are roughly comparable, as Mr. Ryan points out. As for the recovery of a certain amount of vision, to which he refers, the explanation—at least in the pre-cortisone era—was not far to seek.

It is not clear what symptoms in his patient were relieved by cortisone. In any case, the majority quickly improve in general health after the climax has been reached. (Others are, of course, already suffering from vascular and other diseases of old age.) Headache may have ceased to be troublesome by this time, but there is no doubt that many of those who have it have reported immediate relief after section of a temporal artery. This seems to be too well substantiated to be due to coincidence or suggestion alone. All would agree that we should view the disease in its proper perspective and treat it vigorously—without expecting too much—with the means at our disposal.

48A Irvine Street,
Peppermint Grove
Western Australia.
August 17, 1960.

Yours, etc.,
GERALD C. MOSS.

[1] Seddon, H. R. (1953), "Diseases of Domestic Animals in Australia", Part 5, 1:154.

GENERAL PHARMACEUTICAL BENEFITS.

SIR: We hear that there are to be further changes in the multi-coloured Pharmaceutical Benefits handbook. Cameron's kaleidoscope is to have another face-lift. When inserting new plumes into this bird of ill-omen, and tossing the obsolete issue into the waste-paper basket, one feels as Keats with his nightingale:

> My heart aches, and a drowsy numbness pains my sense
> As though of hemlock I had drunk,
> Or emptied some dull opiate to the drains
> And Lethe-ward had sunk.

Could we add another maxim to Sir Robert Hutchison's medical prayer?

> From making the treatment of a disease more grievous to the family physician than the endurance of that disease by the patient; Good Lord deliver us.

Please, Sir, forgive our Latin and—

Ora pro nobis omnibus.

Newcastle West.
August 15, 1960.

SIR: I am one of the many who feels that our freedom of prescribing has been seriously curbed by the Pharmaceutical Benefits Scheme, and I am all in favour of opposing any further developments. However, it seems to me that now that the public has become accustomed to receiving so-called "free medicine", that the solution lies, not in abolition of the scheme, but in the substitution of a simple workable scheme. Our present scheme is based largely on cost, the expensive drugs being restricted in numerous ways, whereas the cheaper drugs are available in large quantities on the list.

I suggest that if the Government were to subsidize every prescription written by a doctor by, say, 66% of its cost, that the cost of the scheme would take care of itself. The patients would be responsible for the remaining 34%. This scheme would ensure that an expensive drug would not be used where a cheaper one was equally effective. We could throw our "little black books" of regulations, and payment would be a matter between the chemists and the Government only. The cost of administration of such a scheme would be very much less, and everyone would be much happier.

9 Sydney Road,
Hornsby, N.S.W.
August 16, 1960.

Yours, etc.,
FLOYD MASTERS.

WHO TUBERCULOSIS SEMINAR.

SIR: The conclusions of the WHO Tuberculosis Seminar (MED. J. AUST., July 30, 1960, p. 190) relate to the tuberculosis situation in the Asian and Pacific countries represented. Some are not necessarily applicable to countries of low disease incidence like Australia and New Zealand.

In Australia adequate beds are available free of charge. Patients with active disease should, in their own interest as well as that of the community, be treated initially in hospital or sanatorium.

Reference is made to triple drug therapy (streptomycin, isoniazid and PAS). In spite of slightly increased toxicity, this combination is favoured by some reliable authorities in the more technically developed countries at the onset

of treatment, while the results of sensitivity tests are awaited. If these are satisfactory, one drug is discontinued and a two-drug regimen prescribed. Most authorities are of the opinion that the most effective combination of two drugs is streptomycin and isoniazid, both given daily.

The daily administration of streptomycin is difficult if the patient is at home, but is easily done in hospital or sanatorium. The intermittent use of streptomycin will, in some cases, lead to loss of bacterial sensitivity to streptomycin and the companion drug. Any adverse effect on the vestibular nerve can be detected earlier in a patient under daily observation.

Further, most serious reactions with PAS usually occur within the first weeks of treatment. These can be most easily recognized and treated in an institution. Desensitization also can best be carried out under similar conditions.

The advantages of an initial period of treatment in an institution are obvious for the public health control of tuberculosis.

Yours, etc.,

HILARY ROCHE,
Commonwealth Director of Tuberculosis.

C/- Department of Health,
Canberra, A.C.T.
August 17, 1960.

MARSUPIAL MILK.

SIR: Reference article on "Marsupial Milk" in the Journal of August 6, 1960, page 227, the following statements are made: (i) "As every schoolboy knows, marsupial young are born at a very immature stage, make their way to the mother's nipples, and there remain attached until they are ready to move about independently." (ii) "An adult brush-tailed possum weighs about three to four pounds, but its single young at birth, after a gestation period of about 20 days, weighs less than half a gramme. After entering its mother's pouch, it attaches itself to one of the two nipples, and remains firmly attached for the first six to ten weeks of its life". Surely it is much more logical to believe that such an immature animal, when newly born, is transported from the birth canal to the pouch by its mother, placed in the pouch by its mother, and even pressed on to the nipple by its mother. I have always understood that the milk is squirted into the immature animal's mouth by its mother, as the animal was too immature to effectively use its own sucking muscles. I have also understood that accurate scientific observation has confirmed this more logical explanation.

2 Hillcrest Avenue,
Caulfield,
Victoria.
August 8, 1960.

Yours, etc.,
S. L. GERMON.

[Fact is stranger than fiction. We have it on good authority that, in species where the facts are known, the new-born marsupial young does make its way by its own efforts to its mother's pouch, and there becomes attached to one of the nipples. In some species it has been suggested that the "embryo" is guided by a moist track made by the mother licking down her fur, but this is uncertain. It has also been suggested that, as Dr. Germon states, milk is expressed into the "embryo's" mouth by the contraction of the mother's cremaster muscle, but again this has not been proved.—EDITOR.]

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

Week-End Course in Recent Advances in Cardio-Vascular Diseases.

THE Post-Graduate Committee in Medicine in the University of Sydney announces that a week-end course in recent advances in cardio-vascular diseases will be held in the Maitland Lecture Hall, Sydney Hospital, on Saturday and Sunday, September 24 and 25, 1960. The course, which will be under the supervision of Dr. G. E. Bauer, is part of the 1960 programme of training in cardio-vascular diseases, and the programme will be as follows:

Saturday, September 24: 10 a.m., "Present Position Concerning Cholesterol Metabolism", Dr. G. V. Hall; 10.45 a.m., "New Methods in the Investigation of Coronary Artery Disease", Dr. George Michell; 11.45 a.m., "Recent Advances in the Management of Ischæmic Heart Disease", Dr. Z. Freeman; 12.30 p.m., question time; 2 p.m., "What's New in the Treatment of Arrhythmias", Dr. R. G. Lewis; 2.45 p.m., "Recent Views of Smoking and the Cardio-Vascular System", Dr. G. E. Bauer; 3.45 p.m., "Techniques for Improved Accuracy in Cardiac Diagnosis", Dr. Anthony D. Jose; 4.30 p.m., question time.

Sunday, September 25: 10 a.m., "New Drugs in the Treatment of Heart Failure", Dr. K. S. Harrison; 10.45 a.m., "Recent Advances in the Management of Pulmonary Heart Disease", Dr. J. G. Richards; 11.45 a.m., "Recent Trends in the Treatment of Hypertension", Dr. R. G. Epps; 12.30 p.m., quiz session—Dr. G. E. Bauer, Dr. R. G. Epps, Dr. K. S. Harrison, Dr. J. G. Richards.

The fee for attendance is £3 3s. Those wishing to attend are requested to make early written application to the Course Secretary, The Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 4497-8. Telegraphic Address: "Postgrad Sydney".

Evening Seminars on Heart Failure.

The fourth in the series of evening seminars will be held at Sydney Hospital on October 5, 12, 19 and 26, at 8 p.m., the subject being "Heart Failure". A detailed programme will be announced at a later date.

Conference at Coff's Harbour.

The Post-Graduate Committee in Medicine in the University of Sydney announces that, in conjunction with the Eastern District Medical Association, a post-graduate conference will be held in the C.W.A. Rooms, Coff's Harbour, on Saturday and Sunday, September 24 and 25, 1960. The programme is as follows:

Saturday, September 24: 2 p.m., registration; 2.30 p.m., "Gall-Bladder and Common Bile Duct", Dr. P. A. Tomlinson; 4 p.m., "Diabetes Made Easy", Dr. F. Hales Wilson.

Sunday, September 25: 9 a.m., annual general meeting of the Eastern District Medical Association; 11.30 a.m., "Diagnosis and Treatment of Anæmia", Dr. F. Hales Wilson; 2 p.m., "The Management of Malignant Disease of the Alimentary Canal", Dr. P. A. Tomlinson.

The Honorary Secretary of the Eastern District Medical Association is Dr. E. Barbour, Belgrave Street, Kempsey. The fee for attendance at the course is £3 3s., and those wishing to attend are asked to notify Dr. A. C. Jones, Grafton Street, Coff's Harbour, particularly mentioning whether hotel or motel accommodation is required. Telephone: Coff's Harbour 100.

NEPEAN-HAWKESBURY MEDICAL ASSOCIATION.

Week-End Course at Lower Portland.

THE Nepean-Hawkesbury Medical Association will conduct a week-end course at Una Voce, Lower Portland, via Windsor, N.S.W., on September 24 and 25, 1960. All medical practitioners are invited to attend. Further information may be obtained from the President, Dr. W. F. J. Cammack, 304 High Street, Penrith, or from the Secretary, Dr. J. J. Bain, Bells Line Road, Kurrajong (telephone K 343).

COMMONWEALTH REHABILITATION SERVICE. (DEPARTMENT OF SOCIAL SERVICES.)

Medical Seminar.

A MEDICAL SEMINAR of general interest, on "Medicine, Surgery, General Practice and Rehabilitation in the Commonwealth Rehabilitation Service", will be held at the Commonwealth Rehabilitation Centre, "Mt. Wilga", 2 Manor Road, Hornsby, on Saturday, September 24, 1960. The guest chairman will be Dr. K. B. Noad.

The programme is as follows: 10.45 a.m., welcome by the Acting Principal Medical Officer, Department of Social Services (Melbourne), Dr. D. O. Longmuir (acting during the absence abroad of Dr. G. G. Burniston). 10.50 a.m., "The Commonwealth Rehabilitation Service and the Practice of Medicine"; speakers: (i) a general practitioner; (ii) Dr.

J. E. D. Goldie, sometime Rehabilitation Medical Consultant. 11.10 a.m., "Basic Principles of Therapeutic Exercise", Dr. R. I. Meyers. 11.20 a.m., "Management of the Patient with Epilepsy, during and after Rehabilitation", Dr. R. D. Pufflett, Rehabilitation Medical Consultant. 11.45 a.m., "The Rationale of Short-Wave Therapy", Dr. B. Norington, Rehabilitation Medical Consultant. 12 noon, questions and discussion. 12.30 p.m., luncheon, by courtesy of the Department of Social Services. 1.15 p.m., symposium on "Lower Limb Amputations and Prostheses, and Indications for Amputation": (i) "In Peripheral Vascular Disease", by Professor John Loewenthal; (ii) "In Osteomyelitis and Late Effects of Trauma", by Dr. Warwick Stening; (iii) Demonstrations, by Dr. J. W. Graham, Rehabilitation Medical Consultant; (iv) "Employment and the Amputee", by Dr. M. Glick, Rehabilitation Medical Consultant; (v) questions and discussion; moderator, Professor F. F. Rundle (subject to confirmation). 2.15 p.m., symposium on "The Management of Neurosis (with Organic Disease or Physical Disability) in Potentially Employable Patients", (i) by a general practitioner, (ii) by Dr. S. Benedek, Rehabilitation Medical Consultant, (iii) by Dr. F. Lawes, Rehabilitation Medical Consultant, 3 p.m., questions and discussion.

After afternoon tea, arrangements will be made for any members wishing to inspect the Centre to do so.

All members of the medical profession are cordially invited to attend. Those proposing or intending to be present are asked to leave a message with the secretary to the Senior Medical Officer, telephone BO 234, extension 387.

THE MELBOURNE MEDICAL POST-GRADUATE COMMITTEE.

Full-Time Course for Primary F.R.A.C.S.

THE Melbourne Medical Post-Graduate Committee will arrange a six-weeks whole-time course in anatomy, physiology and the principles of pathology for candidates for the primary F.R.A.C.S. examination, commencing on January 16, 1961. This course will be conducted by members of University departments, and is designed for candidates who have already studied these subjects extensively by attending organized courses or privately. It will be a coaching course, planned to give the candidates a complete cover of each subject and to supplement the normal lectures by discussion groups, demonstrations, oral testing and quiz sessions.

Enrolments will be limited to 20 candidates, and will not be accepted on a part-time basis. Applications for the course are to be made to the Committee not later than October 18, 1960. A fee of £52 10s. will be charged. Forms of application may be obtained from the Committee at 394 Albert Street, East Melbourne. Telephone: FB 2547.

QUEENSLAND POST-GRADUATE MEDICAL EDUCATION COMMITTEE.

Closed Circuit Television Demonstration.

THE Queensland Post-Graduate Medical Education Committee announces that a series of closed circuit television demonstrations, with the Smith Kline and French team, will be held at the Nurses' Home, Brisbane Hospital, from September 19 to 23, 1960. The programme is as follows.

Monday, September 19: "Adult Medicine and Pædiatric Medicine', 4.30 p.m., demonstration of medical cases—panel members, Dr. L. D. Walters, Dr. V. E. Sampson, Dr. C. C. Ewart, moderator, Dr. D. A. Henderson; 5 p.m., symposium on "Fibrocystic Disease of the Pancreas"—panel members, Dr. T. R. Biggs, Dr. F. W. Arden, Dr. D. C. Fison, Dr. B. L. Hillcoat, Miss Lancaster (biochemist), moderator, Dr. D. A. Henderson.

Tuesday, September 20: 4.30 p.m., surgical session—"Cholecystectomy"—surgeon, Professor N. G. Sutton, assistant, Dr. J. McCaffrey, panel, Mr. F. K. S. Hirschfeld, Mr. D. Yeates, Mr. W. D. Friend, moderator, Mr. R. M. Mitchell.

Wednesday, September 21: 4.30 p.m., gynæcological and obstetrical session, (i) symposium on "Pathological Conditions of the Cervix"—surgeon, Dr. L. P. Sapsford, panel members, Dr. Murray Elliott, Dr. James Hill, Dr. Diana Bendeich (cytologist); (ii) clinical points from obstetrical X-ray films—panel members, Professor Shedden Adam, Dr. K. G. Wilson, Dr. R. J. Byrne, moderator, Dr. E. J. Esler.

Thursday, September 22: 4.30 p.m., demonstration of dermatological cases—panel members, Dr. L. Archibald, Dr. O. E. Nothling, Dr. J. Francis, moderator, Dr. Sue Knyvett; 5 p.m., Queensland Radium Institute demonstration of cases and of techniques used—"Radioactive Iodine in Diagnosis and Treatment", Dr. R. G. Bourne, "Radiotherapy of Skin Cancer", Dr. B. Kynaston, moderator, Dr. K. W. Mead.

Friday, September 23, 4.30 p.m.: "Orthopædics and Anæsthesia', (i) "Smith-Petersen Nailing of Fractured Neck of Femur"; (ii) "Technique of Induction of Combined Anæsthesia"; surgeon, Mr. D. Watson; panel members, Mr. G. R. Anderson, Mr. M. J. Gallagher, Mr. D. J. Tuffley; anæsthetist, Dr. R. Molphy; commentator, Dr. T. O'Rorke Brophy; moderator, Mr. W. Maguire.

Naval, Military and Air Force.

APPOINTMENTS.

THE following appointments, changes, etc., are published in the *Commonwealth of Australia Gazette*, No. 56, of August 11, 1960.

AUSTRALIAN MILITARY FORCES.

Australian Regular Army.

Royal Australian Army Medical Corps (Medical).

The following officers are appointed from the Regular Army Special Reserve, Royal Australian Army Medical Corps (Medical) and to be Captains with Short Service Commissions for a period of four years:—Captains 4/8055 I. C. Miller, 23rd December, 1959; 2/40221 G. W. Duffy, 2/40222 P. N. McGuire and 2/40223 M. R. Pittar, 2nd January, 1960; 1/8091 D. T. O'Connor, 3/40171 T. H. Ritman, 3/40169 B. B. Wainer and 1/8092 K. J. A. Fleming, 6th January, 1960.

1/8093 Captain R. E. Thiel is appointed from the Regular Army Special Reserve, Royal Australian Army Medical Corps (Medical) and to be Captain, 6th January, 1960, with a Short Service Commission for a period of two years.

4/8053 Captain T. T. Teusner is appointed from the Regular Army Special Reserve, Royal Australian Army Medical Corps (Medical) and to be Captain, 3rd February, 1960, with a Short Service Commission for a period of four years and with regimental seniority next after 4/8052 Captain R. F. Carter.

The Short Service Commission granted to 2/40205 Captain W. J. Watson is extended until 5th June, 1962.

Regular Army Special Reserve.

Royal Australian Army Medical Corps (Medical).

The following officers are appointed to the Australian Regular Army, Royal Australian Army Medical Corps (Medical).—Captains SX700101 I. C. Miller, 23rd December, 1959, NX700472 G. W. Duffy, NX700475 P. N. McGuire and NX700473 M. R. Pittar, 2nd January, 1960, QX700201 D. T. O'Connor, VX700371 T. H. Ritman, VX700383 B. B. Wainer, QX700206 K. J. A. Fleming and QX700209 R. E. Thiel, 6th January, 1960, and SX700102 T. T. Teusner, 3rd February, 1960.

Citizen Military Forces.

Northern Command.

Royal Australian Army Medical Corps (Medical).—1/61808 Major R. H. Orr is appointed to command 9th Field Ambulance and to be Temporary Lieutenant Lieutenant-Colonel, 31st May, 1960. 1/28390 Lieutenant-Colonel I. H. Chenoweth relinquishes command 9th Field Ambulance, 30th May, 1960. 1/39227 Captain (provisionally) W. D. Symes relinquishes the provisional rank of Captain, 23rd May, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical) (Northern Command) and is granted the honorary rank of Captain, 24th May, 1960.

Royal Australian Army Medical Corps (Medical).—1/39192 Captain H. A. Muir relinquishes the temporary rank of Major, 24th May, 1960, and is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Northen Command), 25th May, 1960.

Eastern Command.

Royal Australian Army Medical Corps (Medical).—1/39213 Captain G. M. Windrum is transferred to the Reserve of

Officers (Royal Australian Army Medical Corps (Medical)) (Eastern Command), 11th April, 1960. 2/127072 Captain (provisionally) T. J. J. Stewart relinquishes the provisional rank of Captain, 1st May, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Eastern Command) and is granted the honorary rank of Captain, 2nd May, 1960.

Royal Australian Army Medical Corps (Medical).—2/206963 Captain (provisionally) G. R. Pritchard relinquishes the provisional rank of Captain, 19th April, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Tasmania) Command and is granted the honorary rank of Captain, 20th April, 1960. *To be Captain (provisionally), 29th June, 1960*—2/148019 James Henry Field.

Southern Command.

Royal Australian Army Medical Corps (Medical).—3/50203 Colonel E. S. J. King relinquishes the appointment of Consultant Pathologist, Army Headquarters, 10th June, 1960, and is placed upon the Retired List (Southern Command) with permission to retain his rank and wear the prescribed uniform, 11th June, 1960. *To be Majors, 27th May, 1960*—Captains 3/101011 C. W. E. Wilson and 4/31988 R. A. Barter.

Royal Australian Army Medical Corps (Medical).—3/101043 Captain (provisionally) J. D. Callander relinquishes the provisional rank of Captain, 31st May, 1960, is transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Southern Command) in the honorary rank of Captain, 1st June, 1960.

Central Command.

Royal Australian Army Medical Corps (Medical).—4/31903 Lieutenant-Colonel C. M. Gurner, E.D., is appointed to command 3rd General Hospital and to be Colonel, 1st July, 1960. 4/32094 Captain G. M. Chambers is seconded whilst in the United Kingdom, 2nd November, 1959. 4/32064 Major R. S. Colton relinquishes the temporary rank of Lieutenant-Colonel, 5th November, 1959. The following officers are transferred to the Reserve of Officers (Royal Australian Army Medical Corps (Medical)) (Central Command):—Majors 4/32033 J. H. Stace, 6th May, 1960, and 4/32055 R. Hunter, 17th May, 1960. *To be Majors*—Captains 3/101020 D. N. Hawkins, 30th November, 1959, and 4/32067 G. L. Mellor and 4/32103 C. G. Wilson, 9th May, 1960.

Western Command.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 5/45068 Captain T. T. Nicholls is terminated, 11th May, 1960. *To be Captain (provisionally), 12th May, 1960*—5/45068 Trevor Thomas Nicholls.

Royal Australian Army Medical Corps (Medical).—The provisional appointment of 5/26527 Captain D. G. Kermode is terminated, 17th June, 1960. *To be Captain (provisionally), 18th June, 1960*—5/26527 Denis Graham Kermode.

Reserve Citizen Military Forces.

Royal Australian Army Medical Corps (Medical).

Southern Command.—Honorary Captain J. H. Paterson is retired, 30th June, 1960. The resignation of Honorary Captain A. J. Kermode of his commission is accepted, 18th March, 1960.

The following officer is placed upon the Retired List (Southern Command) with permission to retain his rank and wear the prescribed uniform, 30th June, 1960: Colonel H. A. Phillips, E.D.

Northern Command.—To be Honorary Captain, 29th June, 1960—David Gordon Stuart Christie.

ROYAL AUSTRALIAN AIR FORCE.

Permanent Air Force.

Medical Branch.

Seamus Murphy (0310788) is appointed to a short-service commission on probation for a period of twelve months, 4th May, 1960, with the rank of Flight Lieutenant and with seniority in that rank as from 4th May, 1958.

The probationary appointment of Squadron Leader G. H. Wright (0219617) is confirmed.

The short-service commission of Squadron Leader G. C. Nelson (018487) is extended to 30th September, 1962.

The resignation of Squadron Leader W. I. Stuart (0310760) is accepted, 1st June, 1960.

Air Force Reserve.

Medical Branch.

The following Flight Lieutenants (temporary Wing Commanders) are promoted to the temporary rank of Group Captain, 8th June, 1960:—L. G. Travers (257896), M. H. M. Ryan (252894), K. S. Harrison (261888).

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED AUGUST 6, 1960.[1]

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism	1	1(1)	1	..	..	..	..	..	3
Amœbiasis	..	..	..	..	..	..	..	..	..
Ancylostomiasis	4	..	5	..	..	..	5	..	14
Anthrax	..	..	..	..	..	..	..	..	..
Bilharziasis	..	..	..	..	..	..	..	..	..
Brucellosis	1	..	..	..	..	..	..	..	1
Cholera	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	..	..	..	..	..	..	..	..	..
Dengue	..	..	1	..	..	..	..	..	1
Diarrhœa (Infantile)	4(2)	16(10)	3(2)	2(1)	..	1(1)	93	3	122
Diphtheria	..	..	..	..	..	..	..	..	..
Dysentery (Bacillary)	..	..	2	5(4)	..	..	1	..	8
Encephalitis	..	..	..	..	..	..	..	..	..
Filariasis	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice	..	..	..	..	..	..	..	..	..
Hydatid	..	1(1)	..	..	..	..	..	..	1
Infective Hepatitis	68(22)	41(22)	15(4)	27(8)	5(5)	1	..	1	158
Lead Poisoning	..	..	2	..	..	..	..	..	2
Leprosy	..	..	..	..	..	..	..	..	..
Leptospirosis	..	..	1	..	..	..	..	..	1
Malaria	..	..	..	..	..	..	2	..	2
Meningococcal Infection	2	3(2)	..	..	1	..	..	..	6
Ophthalmia	..	..	..	..	..	..	..	..	..
Ornithosis	..	..	..	..	..	..	..	..	..
Paratyphoid	..	..	..	..	..	..	..	..	..
Plague	..	..	..	..	..	..	..	..	..
Poliomyelitis	..	..	..	1	..	..	..	..	1
Puerperal Fever	..	1(1)	..	..	..	..	..	..	1
Rubella	..	3(2)	..	3	..	..	..	..	6
Salmonella Infection	..	..	..	6	..	..	..	..	6
Scarlet Fever	8(3)	..	5	5	1	1	..	..	20
Smallpox	..	..	..	..	..	..	..	..	..
Tetanus	..	..	..	..	..	..	..	..	..
Trachoma	..	..	..	..	1(1)	..	3	..	4
Trichinosis	..	..	..	..	..	..	..	..	..
Tuberculosis	37(21)	22(13)	18(12)	6(6)	5(2)	3(3)	..	..	91
Typhoid Fever	..	..	..	..	..	..	..	..	..
Typhus (Flea-, Mite- and Tick-borne)	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne)	..	..	..	..	..	..	..	..	..
Yellow Fever	..	..	..	..	..	..	..	..	..

[1] Figures in parentheses are those for the metropolitan area.

The following Flight Lieutenants (temporary Squadron Leaders) are promoted to the temporary rank of Wing Commander, 8th June, 1960:—E. D. E. E. O'Brien (257096), J. H. Deakin (261767).

Air Cadet Gregory Charles Beaver (0116702) is provisionally appointed to a commission, 10th July, 1960, with the rank of Pilot Officer.

Australian College of General Practitioners.

GENERAL PRACTITIONERS' CONVENTION.

THE Organizing Secretary of the General Practitioners' Convention, to be held at the Chevron Hotel, Melbourne, from October 10 to 15, 1960, has drawn attention to the need for early registration on the part of visitors to Melbourne for the Convention. Country and interstate members who have not yet registered or requested hotel reservations are reminded that no hotel reservations can be guaranteed after the end of August. Owing to the large numbers registering, many of the invitations to social events will be dependent on priority of registration. The Convention Office is at 132 Gray Street, East Melbourne, Victoria.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Pearson, Bruce James, M.B., B.S., 1959 (Univ. Sydney), 229 Liverpool Road, Enfield.

Tuckwell, Leonard Arthur, M.B., B.S., 1958 (Univ. Sydney), 179 Fox Valley Road, Wahroonga.

Foote, Alan Gregory, M.B., B.S., 1958 (Univ. Sydney), 424 Peel Street, Tamworth.

Notes and News.

Grants for Research into Cancer.

Advice has been received from the Secretary of the New South Wales State Cancer Council that funds are available to the Council for further research into cancer. Applications are now being invited for grants in respect of (*a*) research fellowships, (*b*) travelling fellowships, (*c*) grants-in-aid.

The closing date for the lodgement of applications is October 10, 1960, and such applications must reach the Secretary, the New South Wales State Cancer Council, Box 3944, G.P.O., Sydney, or The Basement, Treasury Building, Bridge Street, Sydney, not later than that date. Application forms and further details may be obtained from the Secretary at the address mentioned above.

Pædiatric Congress in Kassel, Germany.

THE fifty-ninth Congress of the Deutsche Gesellschaft für Kinderheilkunde will be held on September 26 to 28, 1960, at Kassel, Federal Republic of Germany. The main subjects of the Congress will be as follows: cardiology; endocrine disturbances related to primary and secondary sexual development; tuberculosis; fat in the nutrition of infants. There will also be a special session dealing with handicapped children. A full and interesting social programme has been arranged, and there is a trade exhibition. Applications for accommodation should be sent immediately, addressed as follows: Verkehrs- und Wirtschaftsamt Auskunftsstelle Hauptbahnhof, Kiosk Bahnofsplatz, Kassel, Bundesrepublik Deutschland.

Meeting of the Australian Radiation Society (Victorian Branch).

A meeting of the Australian Radiation Society (Victorian Branch) will be held on Tuesday, September 27, 1960, at 5.30 p.m., in the lecture theatre of the Cancer Institute, 481 Little Lonsdale Street, Melbourne. Squadron Leader W. J. Bishop, of the Institute of Aviation Medicine, Point Cook, will speak on "Radiation Hazards in Relation to Aero-Space Medicine". All interested persons are invited to attend.

Deaths.

THE following death has been announced:

CROTTY.—Daniel John Comyns Crotty, on August 24, 1960, at Melbourne.

ELVINS.—Henry Francis Herbert Elvins, on August 29, 1960, at Geelong, Victoria.

Diary for the Month.

SEPTEMBER 13.—New South Wales Branch, B.M.A.: Executive and Finance Committee.

SEPTEMBER 16.—New South Wales Branch, B.M.A.: Ethics Committee.

SEPTEMBER 19.—Victorian Branch, B.M.A.: Finance Sub-Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

Authors of papers are asked to state for inclusion in the title their principal qualifications as well as their relevant appointment and/or the unit, hospital or department from which the paper comes.

References to articles and books should be carefully checked. In a reference to an article in a journal the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of article. In a reference to a book the following information should be given: surname of author, initials of author, year of publication, full title of book, publisher, place of publication, page number (where relevant). The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full data in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in Australia can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £6 *per annum* within Australia and the British Commonwealth of Nations, and £7 10s. *per annum* within America and foreign countries, payable in advance.